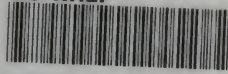


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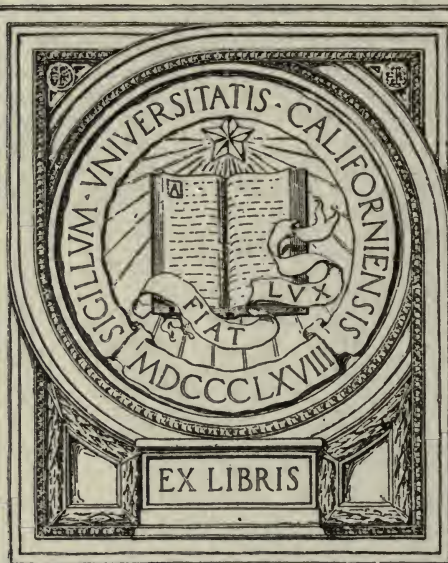
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INSTRUCTIONS
FOR MOUNTING, USING, AND CARING FOR
BARBETTE CARRIAGE

Model of 1917

FOR

12-INCH GUN

Model of 1895 M1

(THIRTEEN PLATES)

AUGUST 8, 1917



WASHINGTON
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U. S. Ordnance dept.

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TABLE OF CONTENTS.

	Page.
List of plates.....	4
General description.....	5
Emplacement.....	5
Carriage.....	5
The action of the carriage.....	5
Principal parts.....	5
Base ring.....	5
Traversing roller system.....	6
Racer.....	6
Side frames.....	6
Working platform.....	7
Cradle.....	7
Recoil and counter recoil system.....	7
Elevating system.....	8
Traversing system.....	10
Azimuth circle and pointer.....	11
Sight.....	11
Range disk.....	11
Lighting apparatus.....	12
Firing mechanism.....	12
Shot tongs.....	12
Grease cups.....	12
Implements.....	12
Assembly.....	12
Base ring.....	13
Leveling.....	13
Distance ring and traversing rollers.....	13
Racer.....	13
Clips.....	14
Azimuth circle.....	14
Rear bracket.....	14
Recoil cylinder assembled to cradle.....	14
Cradle.....	14
Elevating-screw beam.....	14
Traversing bracket.....	14
Front transom.....	14
Working platform.....	14
Spring cylinders secured to cradle.....	14
Gun.....	14
Spring system assembled.....	14
Gearing, etc.....	14
Important points.....	14
Care of the mount.....	15
List of weights.....	15
List of parts.....	16
Contents of armament chest.....	16
Abbreviations.....	17
Piece, number, location, and material.....	17

LIST OF PLATES.

Plate No.	Drawing No.
I. Emplacement.....	10-15-5
II. Longitudinal sections.....	10-15-6
III. Left and rear elevations.....	10-15-7
IV. Right and front elevations.....	10-15-8
V. Base ring.....	10-15-9
VI. Racer.....	10-15-11
VII. Cradle.....	10-15-26
VIII. Spring and recoil cylinder assemblies.....	10-15-28
IX. Recoil cylinder.....	10-15-29
X. Elevating gear assembly.....	10-15-42
XI. Power assembly.....	10-15-47
XII. Traversing gear assembly.....	10-15-63
XIII. Spring compressor.....	10-15-86

INSTRUCTIONS

FOR

MOUNTING, USING, AND CARING FOR BARBETTE CARRIAGES, MODEL OF 1917, FOR 12-INCH GUNS, MODEL OF 1895 M1.

(13 Plates.)

(The parts in *italics* are of particular importance or concern the safety of the carriage and should be especially noted.)

GENERAL DESCRIPTION.

EMPLACEMENT (Plate I).—The emplacements for these carriages are constructed entirely of concrete with a low parapet and permit of 360° traverse. Thirty-six foundation bolts for holding the base ring are set in the concrete when it is laid, and 12 depressions are made for thrust plates.

THE CARRIAGE (Plates II, III, and IV).—The carriage is of the Barbette type, mounting a 12-inch gun, model 1895 M-1. The action of the carriage is as follows:

Upon firing, the gun travels to the rear 30 inches in recoil in the cradle, carrying with it the piston in the cylinder. A portion of the energy of recoil sufficient to return the gun to its firing position is absorbed by the counterrecoil springs. The return of the gun to the firing position is eased by the action of the counterrecoil buffer.

PRINCIPAL PARTS.—The principal parts of the carriage are: The base ring, distance ring, traversing rollers, racer, side frames, platforms, cradle, transoms and clips, spring and recoil cylinders, elevating system, traversing system, sight, lighting and firing circuits, and electrical and motor equipment.

The accessories consist of shot trucks, shot tongs, and implements.

BASE RING (Plate V).—The base ring is made of cast steel No. 2, and is a W-shaped section, which gives vertical rigidity when leveling and releveled. The top of the middle member is machined to form the conical roller path. The base ring is made in two sections, bolted together by eighteen 2½-inch bolts. It is drilled for 36 foundation bolts, 12 leveling screw holes, and 10 holes tapped for 2½-inch standard pipe for the pouring of grout. The outside diameter of the base

ring is 18 feet 4 inches. The base ring has the lower roller path on its upper surface and has an annular flange on its inner edge forming the pintle for the carriage. The traversing rack is bolted to the inner side of the annular ring. The cavities on the outside of the roller path are drained through pipes inserted in the casting into the pockets on the inner side of the roller path. The inner pockets are drained into the well in the center of the carriage.

The wrench holes on the inside of the base ring are provided with a cover having a 1-inch drain hole.

TRAVERSING-ROLLER SYSTEM.—The racer rests and is traversed upon 24 rollers whose axes are maintained in a radial position by bearings bolted to a distance ring. The rollers are of cast steel No. 3 and are solid, with an axle or traversing-roller pin forced into a hole bored in the center of the roller. The distance ring is of cast steel in six sections, bolted together. Bearings of bronze No. 3 for the traversing-roller pins are bolted to the upper side of the distance ring. These bearings are provided with a loop at the top by means of which the traversing roller may be lifted out through holes in the top of the racer.

RACER (Pl. VI).—The racer is of cast steel No. 2, 18 feet 4.5 inches in diameter, and is cast in two pieces, bolted together by sixteen 2.5-inch bolts. It is of box cross section and has the upper roller path on its under surface. An annular flange on its inner edge is lined with bronze, fitting on the pintle of the base ring with a diameter clearance of 0.03 inch. Upon its top surface the side frames and transoms are bolted and keyed. Two openings sufficiently large to remove a traversing roller are provided at each side of the racer. The holes are kept habitually covered by steel plates provided for this purpose. Four oil holes passing through the racer are provided for oiling the pintle surface and 16 oil holes for oiling the traversing-roller bearings. One large steel clip secured to the racer in front and one in the rear engage under a continuous lip on the outside of the base ring and prevent possible overturning.

SIDE FRAMES.—Two side frames, one right and one left, are bolted and keyed to the upper side of the racer. They are made of cast steel No. 3 and are united at their front end by a transom and at the rear end by the rear bracket. On top of each side frame is a bearing for a cradle trunnion. In the lower part are the bearings for the elevating screw beam. The bearings are provided with liners or bushings of bronze No. 4. The cap squares are of cast steel No. 3. The transom is of cast steel No. 3 and provides a bolting surface for the front platform in addition to its primary function of rigidly uniting the front ends of the side frames. The rear bracket is of cast steel No. 3, is bolted between the rear ends of the side frames,

provides a bolting surface for the side platform, and also serves as a platform at the rear of the gun.

WORKING PLATFORM.—The working platform is attached to the side frames by means of two front brackets and six column brackets. The rear bracket also serves as a support for the working platform. The tops of the brackets are at a level one-half inch below the level of the loading platform of the emplacement. The outer end of each of the column brackets is supported by a cast-steel column, the lower end of which is bolted to the top side of the racer. To the outer end of the brackets is bolted an angle iron bent to form a circle 11 feet 7.75 inches radius. Steel plate one-half inch thick is bolted to the brackets and angle iron to form a working platform level with the loading platform of the emplacement.

A steel ladder extends from the racer to the working platform.

CRADLE (Pl. VII).—The cradle is of cast steel No. 2 and is provided with trunnions, which rest in bearings in the side frames. It is bored on the inside and fitted with eight liners of Tobin bronze, which support the weight of the gun. Keyways are provided on top and bottom in which the key on the gun fits to hold the gun in proper position. Four sets of lugs, two on the top and two on the bottom, are provided for holding the four spring cylinders. Between the two lower spring cylinders, on the bottom of the cradle, is the bearing for the recoil cylinder.

RECOIL AND COUNTER-RECOIL SYSTEMS (Pls. VIII and IX).—The recoil cylinder is of cast steel No. 3, finished all over. There are three longitudinal throttling grooves, 45° wide cut in the bore of the cylinder. These grooves are 35 inches long and vary in depth from 0 to 0.5293 inch. The recoil-cylinder head contains the female part of the counter-recoil buffer, the corresponding male part being the front end of the piston rod. A bypass from the counter-recoil buffer to the recoil cylinder is provided by means of an 0.875-inch hole leading into a 1-inch hole, which in turn leads into the cylinder. The adjustment of the counter-recoil buffer is accomplished by means of the adjusting plug, the lower end of which fits into the 0.875-inch hole. The piston rod is of forged steel C, to which is screwed the piston, made of bronze No. 4. The rear end of the piston rod is threaded for the piston-rod nuts, one front and one rear. These nuts are respectively in front and rear of the yoke by means of which the recoil band of the gun is connected to the piston rod. These nuts are of forged steel No. 3. The front nut is held in place by a 1-inch set screw, and the rear nut is prevented from turning by two clamping screws.

The piston rod passes through the rear end of the recoil cylinder through an opening which is lined with a bronze bushing. The rear end of the cylinder is provided with a follower and stuffing-box gland

of bronze and eight rings of Garlock's waterproof hydraulic packing to prevent leakage of oil. To the front end of the recoil cylinder is bolted the recoil-cylinder head, which is of cast steel No. 3, fitted with a bronze bushing to prevent the cutting of the piston rod.

An expansion chamber of cast steel is placed on the top of the cradle and connected by expansion pipes of steel tubing 1.5 inches outside diameter, 0.25 inch thick, to the front end of the cylinder head. At the center of the cradle an overflow coupling is inserted in the expansion pipe. The filling valve is of forged steel No. 3, and is attached to the under side of the cylinder at its rear end, and has a filling valve plug of Tobin bronze. By means of a pipe running from the under side of the filling valve to a funnel at the center of the cradle, the system may be filled. By means of a tee and cock, under the filling valve, the oil may be removed from the system.

Hydrolene oil is used in the recoil cylinder, and with this oil the service pressure in the cylinder is 1,974 pounds per square inch, giving a service pull on the piston of 460,205 pounds.

The counter recoil is accomplished by the counter-recoil springs in the spring cylinders. There are four spring cylinders made of cast steel, each of which is strapped to the cradle by means of three straps of cast steel No. 2. The front end of each cylinder is closed by a spring cylinder head made of cast steel, with eight 0.875-inch drill holes for the escape of air. These holes are also utilized for a tit wrench by means of which the cylinder head is screwed in place. It is held in place by one small set screw. The rear spring cylinder head is similar to the front one, but in addition is provided with a hole for the spring rod. This hole is lined with a No. 2 bronze bushing. Each cylinder contains four triple-coil helical springs, made of spring steel, which are carried on the spring rod and separated by cast-steel separators bushed with bronze No. 4. The outer and inner springs are wound right hand, and the intermediate spring is wound left hand. The spring rod is of forged steel No. 3. At the front end is the spring-rod piston of bronze, screwed on the rod and held in place by the spring-rod nut. On the rear side of the piston are the bearing surfaces for the front ends of the front springs. On the rear end of the rod is screwed a band bushing of bronze No. 3, which fits in the recoil band, and is held in place by means of a band bushing nut, which is made of forged steel No. 3. On the inner side of the rear cylinder head are the bearing surfaces for the rear ends of the rear springs.

ELEVATING SYSTEM (Pls. X and XII).—The gun is elevated and depressed by means of a right-hand elevating screw connected to the gun by a steel strap and actuated by the elevating nut. The elevating nut is driven by bevel gears, the elevating-nut gear which is

keyed to the elevating nut, and the elevating-nut pinion keyed to the horizontal shaft. The horizontal shaft is driven by bevel gears, namely, the horizontal intermediate gear keyed to the shaft, and the vertical intermediate pinion. This pinion is actuated in three ways to be described later.

The elevating nut and screw are supported in the elevating screw beam, which is held in bearings in the side frames. Ball bearings are provided at both the upper and lower ends of the nut.

Elevation is provided for between 0° and 35° , and the elevating screw is provided with stops at these limits. Buffer cylinders are provided to ease the action of the stops. The buffer cylinders are supported in yokes, which are bolted to the elevating screw beam. Longitudinal grooves of varying depths are provided in the cylinders to regulate the flow of oil by the pistons. Steel springs are provided to return the pistons and stuffing boxes and gaskets close the cylinders.

The elevation is accomplished in three ways:

1. Slow motion by handwheel.
2. Quick motion by elevating cranks.
3. By motor power.

For using the quick motion by the elevating cranks, the operating lever is set at "In" on the clutch stop plate. By means of the upper and lower connecting rods and the quick-motion fork, the upper portion of the quick-motion clutch is pulled down against the strength of a spring and meshed with the lower portion. This is in turn meshed with the quick-motion upper bevel gear, which is bolted to the end of the quick-motion shaft, on the lower end of which is keyed the quick-motion lower bevel gear, which in turn is in mesh with the crank gear, which is keyed to the crank shaft. The crank itself is pinned on the shaft. The elevation is accomplished by turning the elevation cranks, the power being transmitted through the above-described chain of shafts and gears to the upper portion of the quick-motion clutch, which is keyed to the vertical shaft. This shaft is keyed inside of the control sleeve, which in turn is keyed to the hand clutch. The hand clutch is meshed with the vertical intermediate pinion, and from there the chain is as previously described.

For slow motion the operating lever is set at "Out," which disengages the lower portion of the quick-motion clutch, and thus omits all that chain of shafts and gears going to the cranks, but leaves the remainder the same. The handwheel is connected to the vertical shaft by the handwheel shaft and the bevel handwheel gears.

For operating by power, the control sleeve is raised by one of the power-clutch forks, operated by a treadle on the platform, so as to mesh with the control-gear clutch and release from mesh with the vertical intermediate pinion. At the same time the power clutch is

raised by the other power-clutch fork and meshed with the underside of the vertical intermediate pinion. The power clutch is keyed to the vertical power shaft, which is connected to the "B" end of the elevating motor shaft by the power pinion and power gear.

The speed of elevation by power is controlled by a Waterbury Tool Co. hydraulic elevating speed gear, by means of which the rotation of the "B" end of the shaft may be varied from 0 to 800 revolutions per minute, while the speed of the "A" end is constant with the motor itself at 800 revolutions per minute. The adjustment is made by the speed-gear control. After the power clutches are thrown in, if it is desired to elevate, the handwheel is turned in the proper direction to elevate and by a train of gears previously described motion is given to the control sleeve. This sleeve is now in mesh with the control-gear clutch, which, by means of the indicator gear and shaft, sets the speed indicator. At the same time another gear on the control-gear clutch is meshed with a bevel gear on the throw-out shaft. This same bevel gear is meshed with the upper control pinion, bolted to the upper end of the upper control shaft. The lower end of this shaft is connected by the beveled control gears to the control mechanism of the hydraulic speed gear, which is thus set to give the speed and direction indicated on the speed indicator. To stop elevating by power, the gun pointer simply moves the elevating handwheel back so that the indicator reads 0.

There is also an automatic mechanism to shut off when the limiting stops are reached. This is accomplished by means of the throw-out mechanism. Keyed to the horizontal shaft is a throw-out pinion, which is meshed through an idler to the throw-out gear. This gear turns freely on the throw-out shaft until either 0° or 35° elevation is reached, when the throw-out crank fitted on the throw-out shaft comes against the throw-out plunger, which is bolted to the gear. The shaft is then turned by the gear, and, being in mesh with the upper control pinion and the control-gear clutch, it thus brings the control back to zero and shuts off the power from the power shaft, and at the same time sets the speed indicator to zero through the chains of gears and shafts previously described.

TRAVERSING SYSTEM (Pl. XII).—The traversing mechanism consists of the traversing rack in 10 segments attached to the base ring by 80 steel traversing-rack screws, the traversing pinion of steel on a vertical forged-steel shaft, provided with bearings in the traversing bracket, and rotating with the carriage, geared to the steel crank shafts which extend across the carriage, by means of a traversing gear wheel and a crank pinion. The cranks are used for normal traversing. Slow-motion traversing is provided for at the telescopic sight by means of a vertical slow-motion shaft, which is in two parts, bolted by a slow-motion shaft coupling. The slow-motion shaft is

geared to the handwheel shaft by means of the slow-motion gear and the handwheel pinion. The lower end of the slow-motion shaft is geared to the worm shaft by the slow-motion pinion and the worm shaft gear. The worm shaft is connected to the traversing shaft by means of a worm, which engages in a worm wheel provided with a multiple disk friction drive. There are 10 friction disks, 5 steel disks keyed to the sleeve of the shaft, and 5 bronze disks keyed to the worm gear. A clutch, operated by a treadle on the platform, throws the slow motion in or out. Cast-steel gear cases are provided for all gears.

AZIMUTH CIRCLE AND POINTER.—The azimuth circle consists of a bronze ring in eight sections. The sections are of T cross section for rigidity. Each section is riveted to a steel support. These supports are grooved so that the eight sections when bolted together form a hollow cylinder surrounding the traversing rollers and thus serving also as a dust guard. The outside of each support is stiffened by means of two stiffeners, which are steel angles, and are riveted to the supports. The sections are accurately bolted together by means of steel straps. The supports are bolted to the base ring by means of bases permanently bolted to the outside of the base ring. These bases are all steel angles. The circle is graduated in degrees, but not numbered until the carriage is in its emplacement.

A pointer case of cast steel is placed in the recess of the racer, which exposes the top of the circle; the pointer body is placed in the case and graduated and numbered as a subscale, to read to ten-hundredths of a degree, and by means of a graduated thumb screw a reading of one-hundredth of a degree can be obtained. The pointer is designed to permit final adjustment by means of set screws on the degree marks of the circle at the time the circle is numbered. The index is of German silver and is carried in a bronze slide. A cast-steel lid is provided for the case.

SIGHT.—The sight with which this carriage is equipped is the 3-inch telescopic sight, model 1912, which, together with its bracket, is described in Ordnance Pamphlet No. 1959. The bracket is mounted on the upper end of the sight standard.

RANGE DISK AND POINTER.—The range disk with its pointer is attached to the left side frame within convenient view of the man at the elevating handwheel by means of a range disk fulcrum screwed into the side frame. The disk itself is of cast steel, to which is screwed a German-silver range scale. The disk is riveted to a range disk gear, which is actuated by the range disk rack attached to the side of the cradle. The backlash is taken up by means of a disk weight of cast iron weighing about 100 pounds, suspended by a disk rope of annealed galvanized sash cord, which is wound on the idler sheave attached to the disk by means of the idler sheave pin.

On the range scale there are three scales. The middle or reference scale is graduated for every 5° elevation. The outer or surface scale and the inner or subcaliber scale are graduated for every 20 yards.

The elevation pointer is contained in a worm housing of cast steel, and is so arranged that it can be adjusted for calibration.

LIGHTING APPARATUS.—The current for both lighting and power enters the pit at a terminal box in the side of the emplacement and is brought into the carriage by means of a 360° contact, and thence distributed by conduits to the points at which it is utilized. The 360° contact consists of a pedestal in the pit, carrying copper rings supported on an insulating plate; brushes bearing on these rings provide the contact. The brushes are carried in a cap and turned about by arms bolted to the racer, and the cables are connected through stuffing tubes to the brushes.

The sight, speed indicator, range scale, and azimuth pointer are illuminated by 2-candlepower lamps. Four 16-candlepower lamps controlled by 5-ampere water-tight switches are provided for general illumination on the upper and lower side frames. Two 16-candlepower portable lamps are also provided and arranged with plug boxes on each side frame.

FIRING MECHANISM.—Electric firing is provided for by a firing magneto, Type G. A., described in Ordnance Pamphlet No. 1814. It is operated by the gun pointer. The firing cable is carried over the top of the cradle back to the breech of the gun, a loop being provided to allow for recoil.

SHOT TONGS.—The shot tongs are of the Gilmartin type for 12-inch projectiles.

GREASE CUPS AND OIL HOLES.—All axles, trunnions, and sliding bearing surfaces are provided with oil holes, there being 54 in all. Each is closed with a screw oil plug. The principal bearings also have grease cups, these being 16 for the cradle and one for each cradle trunnion bearing.

SPRING COMPRESSOR.—The spring compressor consists of a screw, nut, and crank in a frame, which is adjusted to the recoil band. The operation is described on drawing 10-15-86. Plate XIII.)

INSTRUCTIONS FOR ASSEMBLING THE CARRIAGE.

In assembling the carriage, no part should be directly struck with a steel hammer or sledge. A wooden buffer should be interposed, or soft metal drifts or hammers should be used. Care should be exercised to prevent the burring of machined surfaces. All bearing surfaces should be clean, smooth, and well lubricated, prior to assembly.

In assembling the carriage, such blocking, way-planks, hydraulic jacks, ropes and blocks and tackle as are found at Coast Artillery

forts are required. Also a derrick or shears capable of lifting 4 or 5 tons will be very useful.

The following instructions are general only and are intended as a guide for the order of assembly. The work should be under the immediate supervision of an Ordnance machinist.

The following description refers, particularly, to the order in which the parts should be put together:

Place the two halves of the base ring (9G3 and 9H3) over the platform by means of skids and rollers, keeping the half marked "Front" to the front of the battery. Carefully remove all burrs from the finished faces, keys, and bolts, oil the faces that come together, and assemble the base ring halves, with bolts (9A), (9B), (9C), and (9D).

The six bolts (9A) should be inserted in one-half of the base ring before the two halves are brought together, as it is impossible to get them in otherwise.

The tapped holes for leveling screws (9K) should be thoroughly cleaned and the screws oiled and put in place.

The base ring should now be lowered down in place, preparatory to leveling, using the thrust plates (10H) to support the points of the leveling screws.

The leveling of the base ring is now conducted in a manner similar to that prescribed in other Ordnance Pamphlets, and when the leveling is completed, grouting is done as usual.

After leveling the base ring, the wrench hole covers (10F) should be put on the openings in the inner vertical surface of the base ring with the tap bolts (10G).

The sections of the distance ring (10A) should be assembled over the roller path of the base ring with the bolts (10B) and (10C). The traversing rollers (10K) with beamings (10D) should now be assembled to the distance ring with the bearing tap bolts (10E). When assembled, care should be taken to see that all burrs are removed from the finished surfaces and the lower roller path. The distance ring with roller system should be turned by hand on the roller path to see that it works properly.

The two halves of the racer (11B2) and 11C2) should now be brought over the base ring and assembled together with bolts (11D) and the racer joint bolts (11A). The joint bolts (11A) should be inserted in one-half of the racer before bringing the two halves together. After assembling, the racer should be lowered on the roller system, and turned by hand to see that it turns freely. Before lowering the racer in place all oil tubes and holes should be cleaned out and burrs removed from the roller path. *As soon as possible, after turning the racer the roller covers (12 by 1) azimuth circle in eight sections and the azimuth pointer case should be put on to prevent sand and grit from getting into the roller system.*

The front clip (22F) and the rear clip (22H) can be now assembled on the racer with the tap bolts (22G). Place the side frame right (19B1) and the side frame left (20A1) in their positions on the racer and locate accurately in position by the dowel pins (21P). The keys (21S) should be put in place and the right side frame secured to the racer by the tap bolts (19C). The left side frame is secured similarly by the tap bolts (20B). The rear bracket (14E) can now be assembled to the side frames by the bolts (14F) and the rear bracket studs (19A).

The recoil cylinder (29D1) with the cylinder head (30K1) and the piston rod (30B1) should be assembled to the cradle and secured by the recoil cylinder strap (27F). Then the cradle should be assembled in place in the side frames. The elevating screw beam (55A1) and the traversing bracket (68A) should now be placed in position. The front transom (22A1) can be put in place, secured to the side frames, by the bolts (22B) and (22C) and to the racer by the tap bolts (22D) and (22E).

After the transom is in place, the working platform should be assembled to the carriage to provide a working floor when assembling the spring system.

The spring cylinders (35A2) are secured to the cradle by the spring cylinder straps (27G) and (27H) and the spring tap bolts (27E) can now be assembled in place. The spring cylinder head (35B1) should be removed from the spring cylinder and the interior of the cylinder should be slushed.

The gun is then mounted.

The spring system can now be assembled, using the spring compressor provided for that purpose and following the method of procedure shown on Plate XIII.

The gearing should now be assembled to the carriage and all adjustments made. The method of adjusting the elevating gear mechanism is described on Plate X.

IMPORTANT POINTS.

1. The gun should be elevated and depressed to extreme limits to see that all points function freely.
2. The carriage should be traversed through 360° to see that the traversing mechanism moves freely.
3. See that all oil holes are clean and provided with plugs.
4. See that the recoil cylinder contains the proper amount of oil.
5. See that the stuffing box is tight.

CARE OF THE MOUNT.

GENERAL INSTRUCTIONS.—*The carriage should not be allowed to remain in the same position for a long time, and from time to time should be completely traversed and the gun elevated and depressed to limits. All parts of the carriage should be kept free from rust at all times. It is forbidden to use sandpaper on any bearings, piston rods, etc. Emery cloth No. 1 is coarse enough to remove any rust if previously softened with kerosene. Any leakage in the hydraulic recoil system should be immediately repaired.*

FILLING AND CLEANING RECOIL CYLINDER.—The recoil cylinder is filled by means of the funnel and pipe previously described under the description of the recoil system. The gun should be at zero degrees elevation when the cylinder is filled, and the cylinder should be filled full.

To clean the recoil cylinder, drain the cylinder, loosen the stuffing box, and remove the front cylinder head and the rear piston rod nut, and take out the piston. Clean all parts thoroughly and reassemble.

CLEANING CRADLE.—To clean the cradle and sliding surface of the gun, dismantle the spring cylinders by reversing the process of assembly as described on Plate XIII; set the gun at zero degrees elevation and push it back to extreme recoil, by means of blocking and a hydraulic jack. Clean and lubricate all parts thoroughly and return gun to normal position by use of jack. Reassemble the spring cylinders.

List of weights.

Name of part.	Number of pieces.	Weight in pounds.
Leveling screws and plates.....	24.....	324
Base ring.....	2 halves.....	58,800
Azimuth circle.....	1 in 8 sections.....	3,100
Distance ring.....	1 in 6 sections.....	6,050
Traversing rollers.....	24.....	6,792
Racer.....	2 halves.....	66,400
Clips.....	{Front.....	3,060
	{Rear.....	1,685
Side frames.....	2.....	46,480
Front transom.....	1.....	8,825
Rear bracket.....	1.....	4,400
Working platform (complete).....	.....	7,590
Cradle.....	1.....	39,160
Recoil cylinder.....	1.....	4,610
Piston rod (complete).....	.....	2,765
Spring cylinders.....	4.....	8,080
Counter recoil springs.....	48 springs.....	14,020
Spring cylinder rods.....	4 rods with pistons, separators, and band bushings.....	6,365
Elevating screw.....	1.....	910
Elevating screw beam.....	1.....	1,820
Elevating gear (complete).....	1 set.....	2,310
Traversing gear (complete).....	1 set.....	3,628
Speed gear.....	1.....	210
Bolts, nuts, and rivets (complete).....	Set.....	3,630
Electrical equipment (complete).....	.....	.....

List of articles packed in armament chest for 12-inch gun, model of 1895 M1, on 12-inch barbette carriage, model of 1917.

FOR GUN.

- 1 box containing firing mechanism, cleaning brushes, and reamer for primer seat.
- 3 brushes, cleaning, for primer seat.
- 1 cloth, emery, 1 quire, No. 00.
- 1 drift, bronze.
- 1 drift, bronze.
- 1 file, flat, dead smooth, 8-inch.
- 1 file, round, second cut, 8-inch.
- 1 file, half-round, smooth, 8-inch.
- 1 file, three-cornered, 8-inch.
- 3 files, pillar No. 6, 6-inch.
- 3 files, three-cornered, No. 4, 6-inch.
- 3 files, half-round, smooth, 8-inch.
- 3 files, round, smooth, 8-inch.
- 1 gunner's drill.
- 1 gunner's lanyard.
- 1 gunner's pouch.
- 1 gunner's punch.
- 1 gunner's sleeves, pair.
- 1 hammer, copper.
- 1 hammer, machinists' ball peen, 2 pounds—commercial.
- 1 hand mallet.
- 1 mallet, long handle.
- 1 metal scraper.
- 1 obturator nut clamp screw wrench.
- 1 obturator nut wrench.
- 1 pin punch.
- 1 pliers, cutting, 7-inch, pair.
- 10 pounds waste, cotton.
- 2 pounds wire, copper, No. 12.
- 2 pounds wire, copper, No. 16.
- 1 pressure plug wrench.
- 1 reamer, cleaning, for primer seat.
- 1 screw driver—commercial.
- 3 sponges, wagon.
- 1 tit wrench for obturator spindle.
- 4 twine, balls, assorted.
- 1 wrench, monkey.
- 1 wrench, monkey.

FOR CARRIAGE.

- 1 file card, commercial.
- 2 oilers, half pint.
- 1 oiler, locomotive, 1 quart.
- 1 pin wrench, for elevating screw collar.
- 1 roller lift hook.
- 1 scraper, 24-inch.
- 1 screw driver.
- 1 screw driver.
- 1 socket wrench, for distance ring bearing.
- 1 socket wrench, for recoil cylinder head.
- 1 spanner wrench, for nut buffer.

- 1 spanner, for elevating pin nut.
 1 spanner wrench, for friction adjusting nuts, worm bearing, and spring rod.
 1 spanner wrench, for piston rod.
 1 spanner wrench, for spring cylinder head, elevating nut collar, and recoil cylinder stuffing box.
 1 wrench, double, for 0.5 and 0.625 nuts.
 1 wrench, double, for 0.75 and 1 nuts.
 1 wrench, double, for 1.25 and 1.5 nuts.
 1 wrench, double, for 2 and 2.5 nuts.

**NAMES OF PARTS OF 12-INCH BARBETTE CARRIAGE, MODEL OF 1917,
 THEIR LOCATION, PIECE-MARKS, AND MATERIAL OF WHICH THEY
 ARE MADE.**

[The parts are listed alphabetically under the following headings: Carriage proper; Azimuth pointer; Shot tongs; Spring compressor; Filling device and grease cups.]

MEANING OF ABBREVIATIONS IN COLUMN OF MATERIAL.

Ann. C.....	Annealed copper.	Lea.....	Leather.
Br.....	Brass.	R.....	Rubber.
Bz.....	Bronze.	S.....	Steel.
C.....	Copper.	Sh. Bz.....	Sheet bronze.
C. I.....	Cast iron.	Sp. Phos. Bz.....	Spring phosphor bronze.
C. S.....	Cast steel.	Sp. S.....	Spring steel.
F. S.....	Forged steel.	S. R.....	Soft rubber.
Fl. S.....	Flange steel.	Tobin Bz.....	Tobin bronze.
G. I.....	Galvanized iron.	T. S.....	Tool steel.
G. W. H. P.....	Garlock waterproof hydraulic packing.	V. F.....	Vulcanized fiber.
G. S.....	German silver.	W. I.....	Wrought iron.

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
65L	1	Adjusting nut, traversing.	On sleeve.....	F. S.....	
30S	1	Adjusting plug.....	In recoil cylinder head.....	F. S.....	
13G	2	Angle and bracket connections.	Side angle to rear bracket.....	S.....	
56Q	46	Balls, Hess Bright, or equal.	For ball race, inner and outer.	T. S.....	
56P	2	Ball races, inner.....	On elevating nut.....	T. S. "B".....	
56R	2	Ball races, outer.....	do.....	T. S. "B".....	
85B	1	Ball-thrust bearing.....	For traversing shaft.....		Commercial.
85A	1	do.....	For slow-motion shaft, upper.....		Do.
85C	2	Ball-thrust bearings.....	For worm shaft.....		Do.
36C-36D	4	Band bushings.....	On spring rod end, rear, at recoil band.	Bz. No. 3.....	2-36', 2-36D.
36F	4	Band-bushing nuts.....	On band bushings.....	F. S. No. 3.....	
9G3-9H3	1	Base ring.....	On concrete platform.....	C. S. No. 2.....	Front half, 9G3; rear half, 9H3.
9A	6	Base ring, joint bolt.....	At joint on base ring.....	S.....	
50K	1	Bearing.....	Supporting power pinion (52Q).	Bz. No. 4.....	
10D	48	Bearings.....	For traversing rollers.....	Bz. No. 3.....	On distance ring.
27A1	1	Bearing liner.....	In cradle.....	Tobin bz.....	
27B1	7	Bearing liners.....	do.....	Tobin bz.....	
57D	1	Bearing ring.....	On elevating screw beam.....	F. S. No. 3.....	
55D	11	Bearing-ring studs.....	In elevating screw beam (55A1).	S.....	
10E	96	Bearing tap bolts.....	For traversing roller bearings.....	S.....	Do.
21D	4	Polts.....	For trunnion caps (21B-21C).	S.....	
45N	3	do.....	For quick-motion bracket.....	S.....	
45R	2	do.....	For bracket cover (45P).....	S.....	
48K	2	do.....	For control cam (48H).....	S.....	
50R	5	do.....	For speed-gear bracket (50A).....	S.....	
50C	4	do.....	do.....	S.....	
50G	4	do.....	For motor bracket (50F).....	S.....	
50H	4	do.....	do.....	S.....	
50L	2	do.....	For bearing (50K).....	S.....	
51K	8	do.....	For throw-out-gear support.....	S.....	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
51N	6	Bolts	For throw-out housing	S	
55L	4	do.	For straps (55K)	S	
60G	2	do.	For lower control-shaft bracket	S	
67D	2	do.	For slow-motion case	S	
67E	2	do.	do.	S	
67S	4	do.	For slow-motion bracket	S	
67K	6	do.	For lower gear case	S	
68D	5	do.	For traversing case	S	
71C	6	do.	For traversing crank-shaft bracket	S	
14F	8	Bolts, with crown nuts	For rear bracket (14E)	S	
9B	2	Bolts, with nuts	At joint on base ring	S	
9C	2	do.	do.	S	
9D	8	do.	do.	S	
10B	12	do.	At joints on distance ring	S	
10C	24	do.	do.	S	
13U	4	do.	For front plate (13S)	S	
22B	28	do.	For front transom	S	
22C	2	do.	do.	S	
43C	4	do.	For handwheel bracket case	S	
48E	4	do.	For control bracket (48D)	S	
48B	4	do.	For cap (48A)	S	
53C	4	do.	For elevating bracket (53A1)	S	
53D	2	do.	do.	S	
53D	1	Belt, with nut	For elevating-bracket cover (upper) (53E)	S	
53G	1	do.	do.	S	
53H	2	Bolts, with nuts	do.	S	
53K	1	Bolt, with nut	do.	S	
53L	2	Bolts, with nuts	do.	S	
11D	12	do.	In racer	S	
10G	12	Bolts, tap	For wrench-hole cover	S	
12C	4	do.	For wrench-hole cover, rear	S	
12F	4	do.	For wrench-hole cover, front	S	
12H	68	do.	For elliptical hole cover	S	
12AA	8	do.	For strap (12Z)	S	
13D	36	do.	Side plates to side angle	S	
13H	8	do.	For angle and bracket connection (13H)	S	
13W	4	do.	For front plate (13S)	S	
14C	6	do.	For front brackets (14A-14B)	S	
14D	4	do.	do.	S	
14K	18	do.	For column bracket (14H)	S	
14D	24	do.	do.	S	
14N	36	do.	For column (14M)	S	
15M	4	do.	For auxiliary platform	S	
15R	6	do.	For ladder at rear of carriage	S	
19C	18	do.	For side frame, right (19B1)	S	
20B	18	do.	For side frame, left (20A)	S	
21H	2	do.	For left elevation cap (21G)	S	
21L	2	do.	For right elevation cap (21K)	S	
22D	4	do.	For front transom	S	
22E	4	do.	do.	S	
22G	6	do.	For front clip	S	
22G	4	do.	For rear clip	S	
33R	4	do.	Expansion chamber to cradle	S	
33P	2	do.	For overflow coupling	S	
33K	2	do.	For pipe clamp (33H)	S	
33M	1	do.	For pipe hook (33M)	S	
45Q	3	do.	For bracket cover (45P)	S	
46T	2	do.	For clutch stop plate (46S)	S	
48C	1	do.	For cap (48A)	S	
52L	2	do.	For clutch fork bracket	S	
52G	2	do.	For fulcrum bearing (52F)	S	
53B	4	do.	For elevating bracket (53A1)	S	
53M	2	do.	For elevating bracket cover (upper) (53E)	S	
53P	4	do.	For elevating bracket cover (lower) (53E)	S	
54Q	4	do.	For cover supports (54N1) and (54P1)	S	
58D	5	do.	For range disk rack	S	
59D	2	do.	On elevating pointer bracket	S	
59F	2	do.	For worm housing	S	
65M	1	do.	For adjusting nut, trav.	S	
66K	2	do.	For fork shaft bearing	S	
67B	2	do.	For slow-motion bracket cap	S	
67P	6	do.	For cover plate	S	
68B	8	do.	For traversing bracket	S	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
68F	4	Bolts, tap.....	For handhole cover.....	S.....	For traversing case.
A66F	4	do.....	For shoulder rest.....	S.....	
A66G	2	do.....	do.....	S.....	
66L	2	Bolts, countersunk head.....	For fulcrum bearing.....	S.....	
15E-15F	2	Braces.....	For auxiliary platform.....	S.....	
15G-15H	2	Brace angles.....	do.....	S.....	
45P	1	Bracket cover.....	For quick-motion bracket.....	C. S.....	
57A	2	Buffer cylinder.....	In buffer yoke.....	F. S. No. 3..	
57G	2	Buffer cylinder head.....	In buffer cylinder.....	Bz. No. 3..	
57F	2	Buffer piston.....	do.....	F. S. No. 3..	
57P	2	Buffer spring.....	do.....	Sp. S.....	
57M	2	Buffer yoke.....	On elevating screw beam.....	C. S. No. 3..	
55B	8	Buffer yoke studs.....	For buffer yoke to elevating screw beam.....	S.....	
	1	Bushing.....	For shaft bearing in side frame (left 20A) near speed indicator.....	Bz.....	
29A	1	do.....	In recoil cylinder.....	Bz. No. 4..	
35D	4	do.....	In spring cylinder head (rear).....	Bz. No. 2..	
44G	1	do.....	In horizontal intermediate pinion (44H).....	Bz. No. 3..	
67F	1	do.....	In slow-motion case.....	Bz. No. 3..	
67G	1	do.....	do.....	Bz. No. 3..	
21N	20	Bushing screws.....	For elevating cap bushings (21M).....	Tobin Bz.....	
21F	20	Bushing screws (large).....	For trunnion bushings (21E).....	Tobin Bz.....	
48A	1	Cap.....	For control bracket (48D).....	Bz. No. 3..	
21R	2	Cap eyebolts.....	For trunnion caps 21B and 21C.....	S.....	
A66H	2	Clamps.....	For shoulder rest.....	C. S.....	
30E	2	Clamp screws.....	In rear piston-rod nut.....	S.....	
22L	2	Clip eyebolts.....	For front and rear clips.....	S.....	
66B	1	Clutch fork.....	For traversing clutch.....	C. S. No. 2..	
52K	1	Clutch-fork bracket.....	Attached to lower part of elevating bracket.....	C. S.....	
66C	1	Clutch-fork shaft.....	Through side frame (left) to traversing bracket.....	S.....	
46R	1	Clutch spring.....	On vertical shaft lower above quick-motion clutch.....	Sp. Phos. Bz.....	
46P	1	Clutch-spring collar.....	On vertical shaft lower above clutch spring.....	F. S. No. 3..	
46S	1	Clutch stop plate.....	On side frame for operating lever (46Q).....	Bz. No. 3..	
68M	1	Collar (large).....	On traversing shaft.....	Bz.....	
64B	1	do.....	For traversing shaft.....	Bz.....	
64C	1	Collar (small).....	do.....	Bz.....	
64E	1	Collar (large).....	For handwheel shaft.....	S.....	
64F	1	Collar (small).....	do.....	S.....	
64K	2	Collars.....	For crank shaft.....	S.....	
65B	1	Collar.....	For worm shaft.....	Bz.....	
66D	1	Collar (large).....	For clutch fork shaft.....	Bz.....	
66E	1	Collar (small).....	do.....	Bz.....	
67L	1	do.....	On slow-motion shaft (lower).....	Bz.....	
33A	6	Collars.....	On ends of expansion pipes.....	F. S.....	
44D	1	Collar.....	For vertical shaft (lower).....	S.....	
55F	3	Collar screws.....	For screw collar (upper) (55G) and screw collar (lower) (55H).....	F. S.....	
68L	1	Collar set screw (large).....	For collar (large).....	S.....	
67M	1	Collar set screw.....	do.....	S.....	
14M	6	Columns.....	Supporting platform.....	C. S. No. 3..	
14H	6	Column brackets.....	From column (14M) supporting platform.....	C. S.....	
13E-13F	2	Connection angle to side frame.....	On inner edge of side plate.....	S.....	0.25 by 0.25 by 0.5 angle.
13N-13P	2	Connection angles to side plate.....	For front plate (13S).....	S.....	Right (13N), left (13P).
13Q	1	Connection angle to transom.....	do.....	S.....	
46E	1	Connecting rod (lower).....	On left side of carriage for elevating Q. M. shipper.....	S.....	
46D	1	Connecting rod (upper).....	do.....	S.....	
48D	1	Control bracket.....	On side frame (left).....	Bz. No. 3..	
48H	1	Control cam.....	On upper control shaft at elevating bracket.....	F. S. No. 3..	
48P1	2	Control gears.....	In control bracket at junction of control shafts.....	F. S. No. 3..	
48L	1	Control gear clutch.....	On vertical shaft (lower).....	F. S. No. 3..	
60K2	1	Control gear pinion.....	Near hydraulic elevating speed gear.....	F. S. No. 3..	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
48F	1	Control lock.....	Running in control cam speed control details.	F. S. No. 3...	
60F	1	Control shaft bushing.	In elevating bracket.....	Bz. No. 3....	
52A1	1	Control sleeve.....	On vertical shaft (lower)....	Bz. No. 3....	
52B1	1	Control sleeve clutch..	On control sleeve.....	F. S. No. 3....	
15K	2	Corner clips.....	For auxiliary platform.....	S.....	
36E	16	Counter recoil springs (inner).	In spring cylinders (35A1)...	Sp. S.....	
36B	16	Counter recoil springs (intermediate).	do.....	Sp. S.....	
36A	16	Counter recoil springs (outer).	do.....	Sp. S.....	
A66DA	2	Couplings.....	For expansion pipes, upper and lower.	F. S.....	
33F	1	Coupling.....	On ends of expansion pipes..	F. S.....	
46N	1	do.....	Coupling connecting rods, upper and lower together.	F. S.....	
52N1	1	do.....	On lower end of vertical power shaft (52H1).	F. S. No. 3...	
50M	1	Coupling disk.....	Between couplings on motor shaft and hydraulics speed-gear shaft.	Bz. No. 4....	
50E	1	Coupling, motor end..	On motor shaft.....	C. S. No. 3...	
50D	1	Coupling, speed-gear end.	On hydraulic speed-gear shaft.	C. S. No. 3...	
12T	4	Cover handles.....	On cover-handle plate (12W)	F. S.....	
12U	4	Cover-handle fastenings.	do.....	S.....	0.25 thick.
12W	4	Cover-handle plates..	To roller cover (12X1).....	S.....	0.375 thick.
67N	1	Cover plate.....	For lower gear case.....	C. S.....	
12K	20	Cover screws.....	For roller cover to racer.....	S.....	
54N1)	1	Cover support.....	{ Attached to elevating brackets supporting throw-out gear cover.	{ F. S.....	Right (54N1), left (54P1).
54P1)	1				
26C1	1	Cradle.....	On trunnions between side frames.	S.....	
A66EA	6	Crank fastening.....	For cranks.....		Complete.
45C1	1	Crank gear.....	For crank shaft (45B1).....	Bz. No. 4....	
64L2	2	Crank pinions.....	On crank shafts.....	F. S. No. 3....	
64H1	2	Crank shafts.....	In side frames.....	F. S.....	
45B1	1	Crank shaft.....	For elevating quick motion.	F. S.....	
57K	2	Cylinder caps.....	On buffer cylinder.....	Bz. No. 3....	
30M1	1	Cylinder-head bushing.	In recoil cylinder head.....	Bz. No. 4....	
29B	11	Cylinder-head studs..	Cylinder head to recoil cylinder.	F. S. No. 3...	
35E	4	Cylinder-head screws.	Attaching cylinder heads to spring cylinder.	S.....	
26A	10	Cylinder-strap studs..	In cradle for cylinder straps..	S.....	
H23W	1	Depressing direction plate.	On elevating handwheel.....	Bz.....	
77N	2	Direction plates.....	On side frames.....	Bz.....	
58M	1	Disk rope.....	On range-disk gear.....	G. I.....	Sash cord.
58N	1	Disk weight.....	On disk rope.....	C. I.....	
10A	1	Distance ring.....	Between racer and base ring, supported by traveling rollers.	C. S.....	In six sections.
21P	4	Dowel pins.....	For side frames.....	S.....	
	1	Dowel pin.....	In recoil cylinder.....	S.....	
	2	Dowel pins.....	For slow-motion bracket..	S.....	
9F	22	Drain pipes.....	In base ring under roller path.	W. I.....	
A66A	1	Drain plug.....	In overflowing coupling....	F. S.....	
53A1	1	Elevating bracket.....	On side frame, left.....	C. S.....	In two parts.
60A	1	Elevating bracket bushing (upper).	In elevating bracket.....	Bz. No. 3....	In halves.
60B	1	Elevating bracket bushing (intermediate).	do.....	Bz. No. 3....	Do.
60C	1	Elevating bracket bushing (lower).	do.....	Bz. No. 3....	Do.
53E	1	Elevating bracket cover (upper).	For elevating bracket (53A1)	C. S.....	
53N	1	Elevating bracket cover (lower).	do.....	C. S.....	
77B	1	Elevating crank.....	On crank shaft.....	F. S.....	
21T	1	Elevating crank hook (lower).	For hanging elevating crank on side frame.	S.....	
21U	1	Elevating crank hook (upper).	do.....	S.....	
H23Z	1	Elevating direction plate.	On elevating handwheel.....	Bz.....	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
77A1	1	Elevating handwheel.	On handwheel shaft.....	C. S.	
56A	1	Elevating nut.....	In elevating screw beam.....	Bz. No. 4..	
57C1	1	Elevating nut collar..	On elevating nut.....	F. S. No. 3..	
56S	1	Elevating nut cover..	do.....	Sh. Bz.	
56T	1	Elevating nut gear.....	do.....	F. S. No. 3..	
44L1	1	Elevating nut pinion.	In elevating nut on end of horizontal shaft.	Bz. No. 3..	
55C	1	Elevating pin.....	Between straps (55K).....	T. S. "B" ..	
55M	2	Elevating pin nuts...	On outside of straps on elevating screw.	Bz. No. 3..	
55E1	1	Elevating screw.....	Through elevating screw beam (55A1).	F. S. No. 3..	
55A1	1	Elevating screw beam	Between side frames in bearings.	C. S. No. 3..	
56N	1	Elevating screw wiper	In top of elevating nut.....	Bz. No. 4..	
21M	2	Elevation cap bushings.	For elevating screw beam bearing.	Bz. No. 4..	
59H	1	Elevation pointer.....	On elevation pointer bracket	Bz. No. 4..	
59C	1	Elevation pointer bracket.	On side frame, left.....	C. S. No. 3..	
59A	1	Elevation pointer worm.	In worm housing.....	F. S. No. 3..	
12G	17	Elliptical hole covers..	On inside of racer.....	S.	0.25 thick.
33Q	1	Expansion chamber..	On top of cradle.....	C. S.	
33S	1	Expansion chamber head.	On end of expansion chamber.	S.	
33D	1	Expansion pipe (upper).	From expansion chamber to overflow coupling.	Seamless S. tubing.	
33E	1	Expansion pipe (intermediate).	From overflow coupling to expansion pipe (lower).	Seamless S. tubing.	
33C1	1	Expansion pipe (lower).	From expansion pipe intermediate to recoil cylinder.	Seamless S. tubing.	
A66D	2	Filling valve cap.....	On valve body.....	Bz.	
34C	1	Filling valve plug.....	In valve body (34B).....	Tobin Bz.	
30P	1	Follower.....	On rear end of recoil cylinder	Bz. No. 2..	
33G	1	do.....	On ends of expansion pipes.	F. S.	
57N	2	do.....	In buffer cylinder heads..	F. S. No. 3..	
52D	1	Fork connecting rod..	Power shipper from platform.	S.	
76M	4	Fork end.....	On reach rods.....	C. S. No. 2..	
66H	1	Fork shaft bearing....	On side frame (left).....	Bz.	
65Q	1	Friction spring.....	For sleeve.....	Sp. S.	
13M	1	Front angle.....	Under outer edges of front and side plates.	S.	
14A-14B	2	Front brackets.....	On front of carriage supporting platform plate.	C. S.	
22F	1	Front clip.....	On racer engaging under lip on base ring.	C. S. No. 3..	
30H	1	Front piston rod nut..	On piston rod near gun lug.	F. S. No. 3..	
13S	1	Front plate.....	For platform on front of carriage.	S.	
22A1	1	Front transom.....	At front of carriage between side frames.	C. S. No. 3..	
52F	1	Fulcrum bearing.....	On under side of platform flange on side frame (left)	C. S. No. 2..	
66G	1	do.....	Under side plate (left).....	C. S. No. 2..	
12BA	2	Gaskets.....	Under roller cover (12 x 1)	R.	
30T	1	do.....	For adjusting plug (30S)	Ann. C.	
30L1	1	do.....	Under recoil cylinder head.	Ann. C.	
33T	1	do.....	Under expansion chamber head.	V. F.	
33B	5	do.....	On ends of expansion pipes.	V. F.	
34D	1	do.....	For valve body (34B).....	C.	
34E	1	do.....	do.....	S.	
57B	2	do.....	For buffer cylinder.....	C.	
57L	2	do.....	For cylinder cap.....	C.	
	1	do.....	For hand hole cover.....	R.	
65E	5	Gear disk.....	For worm gear.....	Bz. No. 4..	
56W	4	Gear set screws.....	For elevating nut gear.....	S.	
57E	2	Glands.....	In buffer cylinder head.....	Bz. No. 3..	
67Q	2	Half bushings.....	For slow motion bracket..	Bz.	
52P1	1	Hand clutch.....	In control sleeve over vertical power shaft.	F. S. No. 3..	
68E	1	Handhole cover.....	For traversing case.....	Fl. S.	
46L	1	Handle.....	On operating lever (46Q)	Bz.	
46H	1	Handle spring.....	For handle (46L).....	Sp. Phos. Bz.	
A69P	1	Handwheel.....	On handwheel shaft.....	Bz.	
43D	1	Handwheel bracket....	Attached to side frame (left).	C. S. No. 3..	
43A	4	Handwheel bracket bolts.	Handwheel bracket case to side frame, left.	S.	
43B	1	Handwheel bracket case.	Attached to side frame, left..	C. S. No. 3..	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
44P1	1	Handwheel gear.....	On upper end of vertical shaft upper.	F. S. No. 3..	
64G	1	Handwheel pinion.....	On handwheel shaft.....	F. S. No. 3..	
64D1	1	Handwheel shaft.....	In slow-motion bracket.....	F. S. No. 1..	
44M	1	do.....	In handwheel bracket case (43B).	F. S. No. 3..	
44F1	1	Horizontal intermediate gear.	On horizontal shaft engaging with vertical intermediate pinion (44H).	Bz. No. 3...	
44E1	1	Horizontal shaft.....	On elevating slow-motion system.	F. S. No. 1..	
51D1	1	Idler.....	Between throw-out gear and throw-out pinion.	F. S. No. 3..	
60N1	1	Idler bracket.....	On elevating bracket.....	Bz. No. 3....	
60P1	2	Idler bracket bolts....	For idler bracket.....	S.....	
58K	1	Idler sheave.....	On idler sheave pin.....	C. I.....	
58L	1	Idler sheave pin.....	In side frame, left.....	F. S. No. 3..	
51F	1	Idler fulcrum.....	In idler bracket (60N1) supporting idler.	Bz. No. 4....	
54F	1	Indicator.....	On top of indicator shaft (upper).	Bz.....	
54C	1	Indicator collar.....	On top of indicator (54F)....	S.....	Without keyway.
54D	1	do.....	Under indicator gear (54E)....	S.....	With keyway.
54G	1	Indicator pointer.....	On boss on side frame under indicator.	Bz.....	
54A	1	Indicator shaft (upper).	Through bearing in left side frame.	F. S.....	
54B	1	Indicator shaft (lower)	To indicator gear in elevating bracket.	F. S.....	
54K	1	Indicator shaft (intermediate).	Between indicator shafts upper and lower.	F. S.....	
60D	1	Indicator shaft bushing (lower).	In elevating bracket.....	Bz. No. 3...	
60E	1	Indicator shaft bushing (upper).	do.....	Bz. No. 3...	
54L	2	Indicator shaft couplings.	Coupling indicator shafts, upper and lower to indicator shaft intermediate.	F. S.....	
21S	4	Keys.....	For side frames.....	F. S.....	
	4	do.....	For spring cylinder.....	S.....	
	3	do.....	For vertical shafts upper and lower.	S.....	0.437 by 0.312.
	2	do.....	For horizontal shaft (44E1)...	S.....	0.437 square.
	1	do.....	For crank shaft.....	S.....	0.5 square.
	2	do.....	For quick-motion shaft.....	S.....	0.437 square.
	2	do.....	For vertical power shaft.....	S.....	0.437 square.
	1	do.....	For hand clutch.....	S.....	0.437 by 0.312.
	2	do.....	For indicator shaft intermediate.	S.....	0.25 square.
	1	do.....	For indicator shaft (upper)...	S.....	0.25 square.
	2	do.....	For indicator shaft (lower)...	S.....	0.25 square.
	1	do.....	For elevating nut gear.....	S.....	0.5 by 1.
	1	Keyway filling piece...	For spring cylinder strap....	Bz.....	
27K	1	Knob.....	For handle.....	Bz.....	For handwheel.
A65A	1	Ladder sides.....	For ladder at rear of carriage.	S.....	Right (15P), Left (15Q).
15P-15Q	2				
15N	6	Ladder steps.....	For ladder at rear of carriage.	S.....	
21G	1	Left elevation cap....	For elevating screw beam bearing.	C. S. No. 2..	
46F	1	Lever fulcrum pin....	In side frame for operating lever.	F. S. No. 3..	
9K	12	Leveling screw.....	In base ring.....	S.....	Washer head.
12A	1	Liner.....	On racer.....	Bz.....	In sections as convenient.
27D	236	Line screws.....	For bearing liners in cradle...	Tobin Bz...	
27C	72	Locking screws.....	For strap tap bolts (27E)....	Tobin Bz...	
60H	1	Lower control bracket	On speed gear bracket.....	Bz. No. 3...	
48N1	1	Lower control shaft...	From control bracket to hydraulic speed gear.	F. S. No. 3..	
60L2	1	Lower control shaft pinion.	On lower control shaft.....	Bz. No. 3...	
67H	1	Lower gear case.....	On side frame (left).....	C. S.....	
50F	1	Motor bracket.....	To bottom of side frame, left.	C. S. No. 3..	
44C	1	Nut.....	For vertical shaft (upper)...	F. S.....	
	11	do.....	For bearing ring stud (55D)...	S.....	Special. For fulcrum bearing.
	2	do.....	For bolts.....	S.....	
	1	do.....	For shoulder rest.....	S.....	
	8	do.....	For roller pins.....	S.....	
	4	Nuts, crown.....	For rear bracket stud (19A)...	S.....	
26B	10	do.....	For cylinder strap stud.....	S.....	Special.
29C	11	do.....	For cylinder head stud (29B)...	S.....	Do.

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.		
44N	1	Nut, crown.....	For handwheel shaft (44M).....	S.....	Special.		
	2	Nuts, crown.....	For quick motion shaft (45E).....	S.....			
	3	do.....	For bolts (45N).....	S.....			
	2	do.....	For bolts (45R).....	S.....			
	1	Nut, crown.....	For lever fulcrum pin.....	S.....			
	2	Nuts, crown.....	For upper control shaft.....	S.....			
	1	Nut, crown.....	For lower control shaft.....	S.....			
	2	Nuts, crown.....	For bolts (48K).....	S.....			
	5	do.....	For bolts (50B).....	S.....			
	4	do.....	For bolts (50C).....	S.....			
	8	do.....	For bolts (50G).....	S.....			
	2	do.....	For bolts (50L).....	S.....			
	6	do.....	For bolts (51N).....	S.....			
	1	Nut, crown.....	For indicator shaft (upper) (54A).....	S.....			
	1	do.....	For indicator shaft (lower) (54B).....	S.....			
	8	Nuts, crown.....	For buffer yoke stud (55B).....	S.....			
	4	do.....	For bolts (55L).....	S.....			
	1	Nut, crown.....	On elevation pointer worm.....	S.....			
	2	Nuts, crown.....	On buffer piston.....	S.....			
	1	Nut, crown.....	For range disk fulcrum.....	S.....			
	2	Nuts, crown.....	For traversing shaft.....	S.....			
	1	Nut, crown.....	For handwheel shaft.....	S.....			
	2	Nuts, crown.....	For crank shaft.....	S.....			
	1	Nut, crown.....	For slow - motion shaft (lower).....	S.....			
	1	do.....	For worm shaft.....	S.....			
	6	Nuts, crown.....	For traversing crank shaft bracket.....	S.....			
	21Q	4	Nuts, special.....	For dowel pin (21P).....		S.....	With split pins.
	12	Nuts, standard.....	For base ring joint bolt (9A).....	S.....			
		8	do.....	For racer joint bolt (11A).....		S.....	
	A66M	2	Nut strips.....	For shoulder rest.....		Bz.....	
12K	8	Oil-hole screws.....	For oil holes in racer.....	S.....			
12P	13	Oil pipes.....	In racer.....	Br.....			
12Q	2	do.....	do.....	Br.....			
12R	2	do.....	do.....	Br.....			
12S	2	do.....	do.....	Br.....			
	3	do.....	In elevating bracket cover (upper) (53E).....	Br.....			
8	Oil plugs.....	In racer.....	Bz.....				
3	do.....	Side frame, right (19B1).....	Bz.....				
4	do.....	Side frame, left (20A).....	Bz.....				
2	do.....	For trunnion caps 21B and 21C.....	Bz.....				
1	Oil plug.....	For right elevation cap (21K).....	Bz.....				
2	Oil plugs.....	For handwheel bracket case.....	Bz.....				
1	Oil plug.....	For handwheel bracket.....	Bz.....				
1	do.....	For quick motion bracket.....	Bz.....				
2	Oil plugs.....	For bracket cover (45P).....	Bz.....				
2	do.....	For cap (48A).....	Bz.....				
1	Oil plug.....	For bearing (50K).....	Bz.....				
1	do.....	For throw ou gear (51E1).....	Bz.....				
1	do.....	For idler fulcrum (51F).....	Bz.....				
6	Oil plugs.....	For elevating bracket cover (upper) (53E).....	Bz.....				
1	Oil plug.....	For elevating bracket cover (lower) (53N).....	Bz.....				
3	Oil plugs.....	For elevating screw beam (55A1).....	Bz.....				
2	do.....	On elevating nut.....	Bz.....				
1	Oil plug.....	On traversing gear.....	Bz.....				
1	do.....	For slow motion bracket cap.....	Bz.....				
1	do.....	For lower gear case.....	Bz.....				
1	do.....	For collar (small).....	Bz.....				
4	Oil plugs.....	For traversing case.....	Bz.....				
1	Oil plug.....	For collar (large).....	Bz.....				
2	Oil plugs.....	For traversing crank shaft bracket.....	Bz.....				
2	do.....	For spring stirrups.....	Bz.....				
46Q	1	Operating lever.....	At top end of connecting rod (upper), Q. M. shipper details.....	C. S. No. 3.....			
33N	1	Overflow coupling.....	To pipe on side of cradle.....	Bz. No. 2.....			
30R	8	Packing rings.....	At rear end of recoil cylinder.....	G. W. H. P.....			
57H	4	do.....	For buffer cylinder head.....	G. W. H. P.....			
	10	Pins.....	For cylinder strap studs.....	S.....			
2	do.....	For cylinder head bushing.....	Bz. No. 4.....				
4	do.....	For control sleeve clutch (52B).....	Bz.....				

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
	4	Pins.....	For hand clutch (52P).....	Bz.....	Driven.
	1	do.....	For zero strip (59G).....	G. S.....	
	1	do.....	For worm.....	S.....	
	2	do.....	For zero strips (59K).....	G. S.....	
	12	do.....	For elevating bracket bushings.	Bz.....	
46U	1	Pin (type A).....	For quick-motion fork.....	S.....	A=1.18. A=2.175. A=1.8. A=1.5.
46G	1	do.....	For connecting rod, lower..	S.....	
	2	Pins (type A).....	For power clutch fork.....	S.....	
	1	Pin (type A).....	For rod end (52E).....	C. S. No. 2..	
68N	1	do.....	For worm bearing lock.....	S.....	
76G	4	Pins (type A).....	For treadle bars.....	S.....	
76H	2	do.....	do.....	S.....	
76N	3	do.....	For fork ends.....	S.....	
64M1	2	Pinion collars.....	On crank shafts.....	Bz. No. 3..	
33H	2	Pipe clamps.....	For attaching expansion pipes.	F. S.....	
33L	1	Pipe hook.....	do.....	F. S.....	Inserted after drain pipe is in.
	2	Pipe plugs.....	For expansion chamber 33Q.	C. I.....	
30A	1	Piston.....	On piston rod.....	Bz. No. 4..	
30B1	1	Piston rod.....	In recoil cylinder.....	F. S. "C"....	
13R	2	Plate reinforce.....	For front plate (13S).....	S.....	
9E	10	Plugs.....	In outer flange on base ring..	S.....	
46M	1	Plunger.....	For handle (46L).....	Bz.....	
56M	2	Plunger nuts.....	On plunger stud.....	S.....	
56L	2	Plunger stud.....	In elevating nut.....	S.....	
52C1	1	Power clutch.....	On vertical power shaft.....	F. S. No. 3..	
52M	2	Power-clutch forks.....	Operating power clutch and attached to clutch fork bracket.	C. S.....	Front half (11B1); rear half (11C1).
52R	1	Power gear.....	For "B" end of speed gear..	Bz. No. 3..	
52Q1	1	Power pinion.....	Coupled to end of vertical power shaft by coupling (52N).	F. S. No. 3..	
45M	1	Quick-motion bracket.....	On side frame, left.....	C. S.....	
45H	1	Quick-motion clutch.....	On vertical shaft, lower.....	F. S. No. 3..	
46A1	1	do.....	do.....	Bz. No. 4..	
46B	1	Quick-motion fork.....	Quick-motion shipper details.	C. S. No. 2..	
45G1	1	Quick-motion lower gear.....	Lower end of quick-motion shaft in quick-motion bracket.	F. S. No. 3..	
45E1	1	Quick-motion shaft.....	On quick-motion elevating system from quick-motion bracket to elevating bracket.	F. S. No. 3..	
45F1	1	Quick-motion upper gear.....	Upper end of quick-motion shaft in elevating bracket.	Bz. No. 4....	
11B1-11C1	1	Racer.....	On traversing rollers.....	C. S. No. 2..	In 4 parts. 76K elev. 76L trav.
11A	4	Racer joint bolts.....	At joint on racer.....	S.....	
58B1	1	Range disk.....	On range disk fulcrum.....	C. S. No. 3..	
58E1	1	Range disk fulcrum.....	In side frame (left).....	F. S. No. 3..	
58A1	1	Range disk gear.....	On range disk.....	Bz. No. 4..	
58 1	1	Range disk rack.....	On cradle.....	C. S. No. 3..	
58G1	1	Range scale.....	On range disk.....	G. S.....	
76K	2	Reach rods.....	For clutch mechanism.....	S.....	
76L	1	Rear bracket.....	Supporting platform at rear of carriage.	C. S. No. 3..	
19A	4	Rear bracket stud.....	Rear bracket to side frame..	S.....	
22H	1	Rear clip.....	On racer engaging under lip on base ring.	C. S. No. 3..	Commercial. Do. Do. Do. Do.
30G	1	Rear piston rod nut.....	On piston rod near gun lug..	F. S. No. 3..	
29D	1	Recoil cylinder.....	Supported under cradle.....	C. S. No. 3..	
30K1	1	Recoil cylinder head.....	On front end of recoil cylinder	C. S. No. 3..	
27F	1	Recoil cylinder strap.....	On cradle supporting recoil cylinder.	C. S. No. 3..	
21K	1	Right elevation cap.....	For elevating screw beam..	C. S. No. 2..	
	88	Rivets.....	For liner 12A.....	Bz.....	
		Rivets 0.75.....	For side plates to angles....	S.....	
		Rivets 0.625.....	For side and front plates to angles.	S.....	
	16	Rivets.....	For bushing (35D).....	Bz.....	
66F	1	Rocking lever.....	On clutch fork shaft.....	C. S. No. 2..	Commercial. Do. Do. Do. Do.
52E	1	Rod end.....	On fork connecting rod (52D)	C. S. No. 2..	
76D	8	Rollers.....	On roller pins.....	Bz.....	
85Q	1	Roller bearing.....	For vertical shaft (lower)....		
85S	2	Roller bearings.....	For horizontal shaft.....		
85F	1	Roller bearing.....	For hand wheel shaft (44M)..		
85H	1	do.....	do.....		
85 A	1	do.....	For crank shaft (45B1).....		

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
85GA	1	Roller bearing	For crank shaft (45B1) .....	.....	Commercial.
85U	2	Roller bearings	For quick-motion shaft (45E) .....	.....	Do.
85EA	1	Roller bearing	For traversing shaft .....	.....	Do.
85KA	2	Roller bearings	do. ....	.....	Do.
85N	2	do.	do. ....	.....	Do.
85X	2	do.	do. ....	.....	Do.
85L	2	do.	For slow-motion shaft .....	.....	Do.
85AA	3	do.	For worm shaft .....	.....	Do.
45D	2	Roller-bearingsleeves	In quick-motion bracket and bracket cover.	F. S. No. 3 ..	
12x1	2	Roller covers	At opening in racer near joints.	S.	0.375 thick.
76E	8	Roller pins	In clutch forks	S.	
13C	52	Screws	Side plates to front angle	Tobin Bz.	
13C	4	do.	For front plate	Tobin Bz.	
15L	14	do.	For auxiliary platform	Tobin Bz.	
	2	do.	For indicator pointer (54G)	Bz.	
55G	1	Screw collar, upper	On upper end of elevating screw (55E1)	F. S. "O" ..	Casehardened.
55H	1	Screw collar, lower	On lower end of elevating screw (55E1)	F. S. "O" ..	Do.
27L	1	Screw, countersunk head	For key-way filling piece	Bz.	
56B	1	do.	For elevating nut (56A)	S.	
56F	1	do.	For wiper key (56E)	Bz.	
58H1	32	do.	For range scale	G. S.	
77P	6	do.	For direction plates	Bz.	
A69N	3	do.	do.	Bz.	
H23U	4	do.	do.	Bz.	
56U	8	Screws, fillister head	For elevating nut cover	Bz.	
	2	Screws, headless	For piston rod	S.	
12N	8	Screw plugs	Oil holes in racer	S.	
30F	5	Set screws	For recoil cylinder details	S.	
60M	1	Set screw	For lower control shaft pinion.	S.	Cup point.
71A	1	Shoulder rest support	In trunnion cap	F. S. No. 3 ..	
13K-13L	2	Side angles	Under outer edge of side plate.	S.	Right (13K), left (13L).
13A-13B	2	Side plates	Platform on sides of carriage	S.	Right (13A), left (13B).
20A	1	Side frame, left	On racer	C. S. No. 3 ..	
19B1	1	Side frame, right	do.	C. S. No. 3 ..	
65N	1	Sleeve	On traversing shaft	F. S.	
65F	5	Sleeve disks	For sleeve	S.	
65P	1	Sleeve liner	In sleeve	Bz. No. 4 ..	
65R	1	Sleeve plate	For sleeve	F. S.	
67R	1	Slow-motion bracket	On side frame (left)	C. S.	
67A	1	Slow-motion-bracket cap	On slow-motion bracket	C. S.	
67C	1	Slow-motion case	On slow-motion bracket	C. S.	
64S1	1	Slow-motion gear	On slow-motion shaft (upper).	Bz. No. 3 ..	
64R	1	Slow-motion pinion	On slow-motion shaft (lower)	F. S. No. 1 ..	
64N	1	Slow-motion shaft coupling	For slow-motion shafts	F. S.	
64Q	1	Slow-motion shaft (lower)	From coupling to lower gear case.	S.	
64P1	1	Slow-motion shaft (upper)	From slow-motion bracket to coupling.	S.	
50A	1	Speed-gear bracket	Attached to bottom of side frame (left)	C. S. No. 3 ..	
A65B	1	Spindle	For handle	S.	For handwheel.
	1	Split pin	For horizontal intermediate gear (44F1)	S.	
	1	do.	For elevating nut pinion (44L1)	S.	
	1	do.	For rod end (52E)	C. S. No. 2 ..	
	4	Split pins	For spring-rod nuts	S.	
	1	Split pin	For clutch-fork shaft	S.	
	1	do.	For worm-bearing lock	S.	
	4	Split pins	For fork ends	S.	
	2	do.	For traversing crank	S.	
35A2	4	Spring-cylinders	On cradle supported by straps.	C. S.	
27G-27M	4	Spring-cylinderstraps	On cradle for supporting spring cylinder.	C. S. No. 2 ..	With keyway.
27H-27N	4	do.	do.	C. S. No. 2 ..	Without keyway.
27P	4	do.	On cradle for supporting spring.	C. S. No. 2 ..	Without keyway or drilled hole.

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
35B1	4	Spring-cylinder heads (front)	For spring cylinders.....	C. S.....	
35C	4	Spring-cylinder heads (rear).	On spring cylinders.....	C. S. No. 3..	
76A	2	Spring plungers.....	In spring stirrups.....	F. S. No. 3..	
36K	2	Spring-rod ends (front)	Cn front end of spring rods (lower).	F. S. No. 3..	
36H	2	Spring-rod ends (rear)	Cn rear end of spring rods (lower).	F. S. No. 3..	
36Q1	2	Spring rods (lower)...	In lower spring cylinders...	F. S. No. 3..	
36P	4	Spring-rod nuts.....	Cn front end of spring rods..	F. S. No. 3..	
36G	4	Spring-rod pistons....	Cn front end of spring rod..	Bz.....	
36N	2	Spring rods (upper)...	In upper spring cylinders...	F. S. No. 3..	
36L	12	Spring separators.....	In spring cylinders between springs.	C. S.....	
36M	12	Spring-separator bushings.	In spring separators.....	Bz. No. 4....	
76B	2	Spring stirrups.....	Cn treadle bars.....	Bz. No. 3....	Tempered.
59B	1	Spring washer.....	Cn elevating pointer worm.	S.....	
46K	1	Stem.....	For handle (46L).....	F. S.....	
56C	2	Stop plungers.....	In elevating nut (56A).....	T. S. "B"....	
56G	2	Stop-plunger keys....	In stop plunger (56C).....	S.....	
56K	2	Stop-plunger pins....	In stop plunger for stop-plunger rollers.	S.....	
56D	2	Stop-plunger rollers...	On stop plunger (56C).....	Bz. No. 4....	0.125 thick.
12Z	4	Straps.....	Oil pipes to racer.....	S.....	
55K	2	do.....	On sides of head on elevating screw.	F. S. No. 3..	
27E	72	Strap tap bolts.....	For straps 27G, 27M, 27N, 27P, 27F.	S.....	
30Q	1	Stuffing-box gland....	At rear end of recoil cylinder.	Bz. No. 2....	
	1	Taper pin.....	For vertical shaft (lower)...	S.....	
	1	do.....	For collar (44D).....	S.....	
	2	Taper pins.....	For vertical shaft coupling (44K).	S.....	
	1	Taper pin.....	For throw-out shaft (51A)...	F. S. No. 1..	
	1	do.....	For idler fulcrum (51F).....	S.....	
	1	do.....	For throw-out pinion.....	S.....	
	1	do.....	For coupling (52N).....	S.....	
	4	Taper pins.....	For indicator-shaft couplings (54L).	S.....	
	2	do.....	For elevating-pin nut (55M).	S.....	
	1	Taper pin.....	For range-disk fulcrum....	S.....	
	1	do.....	For idler-sheave pin.....	S.....	
	1	do.....	For traversing shaft.....	S.....	
	1	do.....	do.....	S.....	
	1	do.....	For handwheel shaft.....	S.....	
	1	do.....	do.....	S.....	
	2	Taper pins.....	For crank shaft.....	S.....	
	2	do.....	For slow-motion shaft coupling.	S.....	
	1	Taper pin.....	For worm shaft.....	S.....	
	1	do.....	For clutch-fork shaft.....	S.....	
	1	do.....	do.....	S.....	
51B1	1	Throw-out crank.....	On throw-out shaft (51A)...	F. S. No. 3..	
51E1	1	Throw-out gear.....	On throw-out gear support (51G).	Bz. No. 4....	
	1	Throw-out gear cover.	Over throw-out gear.....	Fl. S.....	
51G	1	Throw-out gear support.	To elevating bracket-supporting throw-out gear.	Bz. No. 3....	
51M1	1	Throw-out housing...	Over throw-out crank and attached to throw-out gear.	Bz. No. 3....	
51H1	1	Throw-out pinion....	On horizontal shaft.....	Bz. No. 4....	
10H	12	Thrust plates.....	Under base ring.....	S.....	
51L	2	Throw-out plugs.....	In throw-out housing (51M).	Bz. No. 3....	
51Q1	2	Throw-out plungers...	In throw-out housing.....	F. S. No. 3..	
51P	2	Throw-out plunger springs.	Operating throw-out plunger in throw-out housing.	Sp. S.....	
51A	1	Throw-out shaft.....	In throw-out gear support attached to elevating bracket.	F. S. No. 1..	
51C	1	Throw-out shaft nut..	On throw-out shaft (51A)...	S.....	
15C-15D	2	Top plates.....	For auxiliary platform.....	S.....	
68A	1	Traversing bracket....	On racer.....	C. S. No. 2..	
68C	1	Traversing case.....	On traversing bracket.....	C. S. No. 2..	
66A	1	Traversing clutch....	On traversing shaft.....	Bz. No. 4....	
77E1	2	Traversing cranks....	On crank shaft.....	F. S.....	
71B	2	Traversing crank-shaft brackets.	On side frames.....	C. S. No. 2..	
64U1	1	Traversing gear.....	On traversing shaft.....	C. S. No. 3..	

CARRIAGE PROPER—12-INCH BARBETTE CARRIAGE MODEL OF 1917—Continued.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
A69M	1	Traversing hand-wheel direction plate.	On handwheel.....	Bz.....	
64T	1	Traversing pinion....	On traversing shaft.....	S.....	
65H	1	Traversing rack.....	In base ring.....	F. S. No. 2..	
65K1	1	Traversing-rack screws.	For traversing rack.....	S.....	
10K	24	Traversing rollers.....	Between racer and base ring.	C. S. No. 3..	
10L	24	Traversing-roller pins.	In traversing rollers.....	S.....	
64A	1	Traversing shaft.....	In traversing bracket.....	F. S. No. 3..	
76F	2	Treadles.....	Through left platform.....	C. S. No. 2..	
76P	2	Treadle bars.....	On treadles.....	Bz. No. 2..	
76C	2	Treadle springs.....	In spring stirrups.....	Sp. S.....	
21E	2	Trunnion bushings.....	Trunnion seat in side frames.	Bz. No. 4..	
21B-21C	2	Trunnion caps.....	On side frames.....	C. S. No. 3..	
A66L	2	Tubes.....	For shoulder rest.....	R.....	
77C	1	do.....	For elevating crank.....	Br.....	
77F	2	do.....	For traversing cranks.....	Br.....	
48G	1	Upper control pinion.....	On upper control shaft.....	F. S. No. 3..	
48M	1	Upper control shaft.....	From elevating bracket to control bracket.	F. S. No. 3..	
34B	1	Valve body.....	In bottom of recoil cylinder.	F. S. No. 3..	
44H	1	Vertical intermediate pinion.	On vertical power shaft engaging with horizontal intermediate gear (44F1).	F. S. No. 3..	
52H2	1	Vertical power shaft..	Connecting from vertical shaft (lower).	F. S. No. 3..	
44K1	1	Vertical-shaft coupling.	Connecting vertical shaft (upper) and vertical shaft (lower).	F. S. No. 1..	
44B1	1	Vertical shaft (lower).	Elevating slow-motion system.	F. S. No. 1..	
44A1	1	Vertical shaft (upper)	do.....	F. S. No. 1..	
58F1	1	Washer.....	For range-disk fulcrum.....	F. S.....	
65S	1	do.....	For sleeve.....	Bz. No. 4..	
77D	1	do.....	For elevating crank.....	S.....	
77G	2	do.....	For traversing crank.....	S.....	
A65C	1	do.....	For handle.....	S.....	
46C	1	Washer crown nut.....	For lever fulcrum pin.....	S.....	For handwheel.
U39F	1	Water bucket.....	With carriage.....	Indurated fiber.	Commercial.
56E	1	Wiper key.....	On elevating nut for elevating screw wiper.	S.....	
65C	1	Worm.....	On worm shaft.....	F. S. No. 3..	
68K	1	Worm bearing.....	In traversing bracket.....	C. S. No. 2..	
68H	1	Worm-bearing lock.....	On traversing bracket.....	S.....	
65G	1	Worm gear.....	On sleeve.....	Bz. No. 4..	
59E	1	Worm housing.....	On elevation-pointer bracket	C. S. No. 3..	
65A1	1	Worm shaft.....	From worm-shaft gear to traversing bracket.	F. S. No. 3..	
65D	1	Worm-shaft gear.....	On worm shaft.....	Bz. No. 3..	
10F	12	Wrench-hole covers...	On base ring opposite inner foundation bolts.	S.....	0.25 thick.
12D-12E	2	Wrench-hole covers (front).	At point of racer joint.....	S.....	Do.
12B	2	Wrench-hole covers (rear).	do.....	S.....	Do.
59G	1	Zero strip.....	On worm housing.....	G. S.....	
59K	2	Zero strips.....	On elevation pointer.....	G. S.....	

AZIMUTH POINTER—12-INCH BARBETTE CARRIAGE, MODEL OF 1917.

Piece mark.	No.	Name of part.	Location.	Material.	Remarks.
69C	8	Bases.....	For azimuth circle.....	S.....	
69F	88	Bolts, tap.....	do.....	S.....	
69G	64	do.....	do.....	S.....	
69H	80	do.....	do.....	S.....	
70F	2	Collars.....	On screw.....	Bz.....	
70B	1	Index.....	In slide.....	G. S.....	
70M	1	Lid.....	For pointer case.....	C. S.....	
70D	1	Nut.....	In pointer body.....	Bz.....	
70N	1	Pin.....	For lid.....	Bz.....	
70G1	1	Pointer body.....	In pointer case.....	Bz.....	
70K	1	Pointer case.....	On racer.....	C. S.....	
	64	Rivets.....	For azimuth circle.....	S.....	One head counter-sunk.
	112	do.....	do.....	S.....	
	56	do.....	do.....	S.....	Do.
	72	do.....	do.....	S.....	
69A	1	Scale.....	do.....	Bz.....	In 8 sections.
70E	1	Screw.....	In pointer body.....	Tobin Bz.....	
70L	10	Screws, countersunk head.....	For pointer case.....	Bz.....	
70H	2	Screws, flister head.....	For pointer body.....	Bz.....	
70C	1	Screw, flister head.....	For index.....	Bz.....	
70P-70Q	2	Sleeves.....	On collar.....	G. S.....	{One R. 70P. One L. 70Q.
70A	1	Slide.....	In pointer body.....	Bz.....	
69E	16	Stiffeners.....	For azimuth circle.....	S.....	
69D	8	Straps.....	do.....	S.....	
69B	8	Supports.....	do.....	S.....	
	2	Taper pins.....	For screw.....	G. S.....	

LIST OF PARTS FOR SHOT TONGS (7 PAIRS FOR EACH CARRIAGE), 12-INCH BARBETTE CARRIAGE, MODEL 1917.

NC16B	2	Cams.....	In frame.....	Bz.....	
NC16D	2	Cam bolts.....	For cams.....	F. S.....	
NC16N	1	Clevis.....	In frame.....	F. S.....	
NC16K	2	Clip blocks.....	On rope.....	F. S.....	
NC16M	2	Clip nuts.....	For clip blocks.....	F. S.....	
NC16L	2	Clip washers.....	do.....	F. S.....	
NC16A	1	Frame.....	Portable.....	C. S.....	
NC16F	2	Links.....	In cams.....	F. S.....	
NC16P	1	Nut.....	For clevis.....	S.....	
NC16E	4	Nuts.....	For cam bolt.....	S.....	.312 $\frac{5}{16}$ thick.
	2	Pins.....	For links.....	S.....	
NC16H	1	Ring.....	On rope.....	F. S.....	
NC16J	1	Rope.....	On links.....	Wire rope.....	
NC16G	4	Rope guides.....	In frame.....	F. S.....	
NC16C	4	Stop pins.....	do.....	F. S.....	

LIST OF PARTS FOR SPRING COMPRESSOR FOR 12-INCH BARBETTE CARRIAGE, MODEL OF 1917.

85D	1	Ball thrust bearing.....	For worm.....		Commercial.
85E	1	do.....	For worm wheel.....		Do.
U244B	1	Bushing.....	In spring compressor frame.....	Bz. No. 3.....	
U244G	2	Centering rings.....	For end of spring compressor frame.....	Bz. No. 2.....	{U244H, A=6.24. U244G, A=6.11.
U244H	1	Coupling.....	In spring compressor frame.....	F. S. No. 3.....	
U243A	1	Compressor crank.....	On worm.....	F. S.....	
U244L	1	Crank fastening.....	On compressor crank.....		Complete.
U244K1	1	Frame nut.....	In spring compressor frame.....	F. S. No. 1.....	
	1	Grease cup, Lunkenheimer No. 4 Tiger or equal.....	For spring compressor frame.....		Commercial.
	4	Oil plugs.....	In spring compressor frame.....	Bz.....	
	1	Pin.....	For coupling.....	S.....	
	1	do.....	For spring compressor screw.....	S.....	Driven.

SPRING COMPRESSOR, 12-INCH BARBETTE CARRIAGE, MODEL OF 1917.

Piece mark.	No.	Name of material.	Location.	Material.	Remarks.
U244F	1	Set screw.....	In spring compressor frame..	S.....	
U243C	1	Screw plug.....	In spring compressor screw..	S.....	
U244E1	1	Spring compressor frame.	Adjusted to recoil band.....	C. S. No. 2..	
U243B1	1	Spring compressor screw.	In spring compressor frame..	S.....	
U243D	2	Thread guard.....	In spring cylinders.....	C. S. No. 3..	
U244P	1	Tube.....	For compressor crank.....	Br.....	
U244M	1	Washer.....	do.....	S.....	
U244A	1	Worm.....	In spring compressor frame..	F. S. No. 3..	
U244C1	1	Worm nut.....	do.....	Bz. No. 4..	
U244D	1	Worm wheel.....	On spring compressor screw..	Bz. No. 4..	

LIST OF PARTS FOR FILLING DEVICE FOR 12-INCH BARBETTE CARRIAGE, MODEL OF 1917.

U251G	1	Aircock, lever handle.	For filling funnel.....	Br.....	Lunkenheimier fig. 980 or equal.
U251C	1	Ell 0.5.....	do.....	Br.....	
U251B	1	Ferrule.....	do.....	Bz.....	
U251A	1	Funnel.....	do.....	C.....	0.062 ($\frac{1}{16}$) thick.
U251E	1	Nipple 0.5 by 3.....	do.....	Br.....	
U251N	1	Nut.....	do.....	Bz.....	
U251L	1	Pipe.....	do.....	Br.....	46.5 long.
U251M	1	do.....	do.....	Br.....	58.5 long.
U251P	1	Special nipple.....	do.....	Bz.....	
U251Q	1	Tee 0.5.....	do.....	Br.....	
U251D	1	Union 0.5.....	do.....	Bz.....	Lunkenheimier fig. 457 or equal.
U251F	1	Washer.....	do.....	Lea.....	0.125 thick.

GREASE CUPS (18 PER CARRIAGE), 12-INCH BARBETTE CARRIAGE, MODEL OF 1917

A2A	1	Body.....	Screwed into carriage.....	Bz.....	
A23	1	Cap.....	On body.....	Bz.....	
A2D1	1	Cup, leather.....	Under plunger.....	Lea.....	
	2	Gaskets.....	Between body and oil pipe when grease cup is seated on pipe connection.	C.....	
	1	Pin.....	In plunger.....	Bz.....	
A2E3	1	Plunger.....	Inside body.....	Bz.....	
A2J	1	Plunger nut.....	On plunger.....	Bz.....	
A2G	1	Screw, round head...	For plunger.....	Bz.....	
A2H	1	Screw.....	Secures cup leather to plunger.	Bz.....	
A2F	1	Spring.....	Between cap and plunger...	S.....	
A2C1	1	Washer.....	Under cup leather.....	Bz.....	
A2K	1	Washer, lock.....	For plunger.....	S.....	

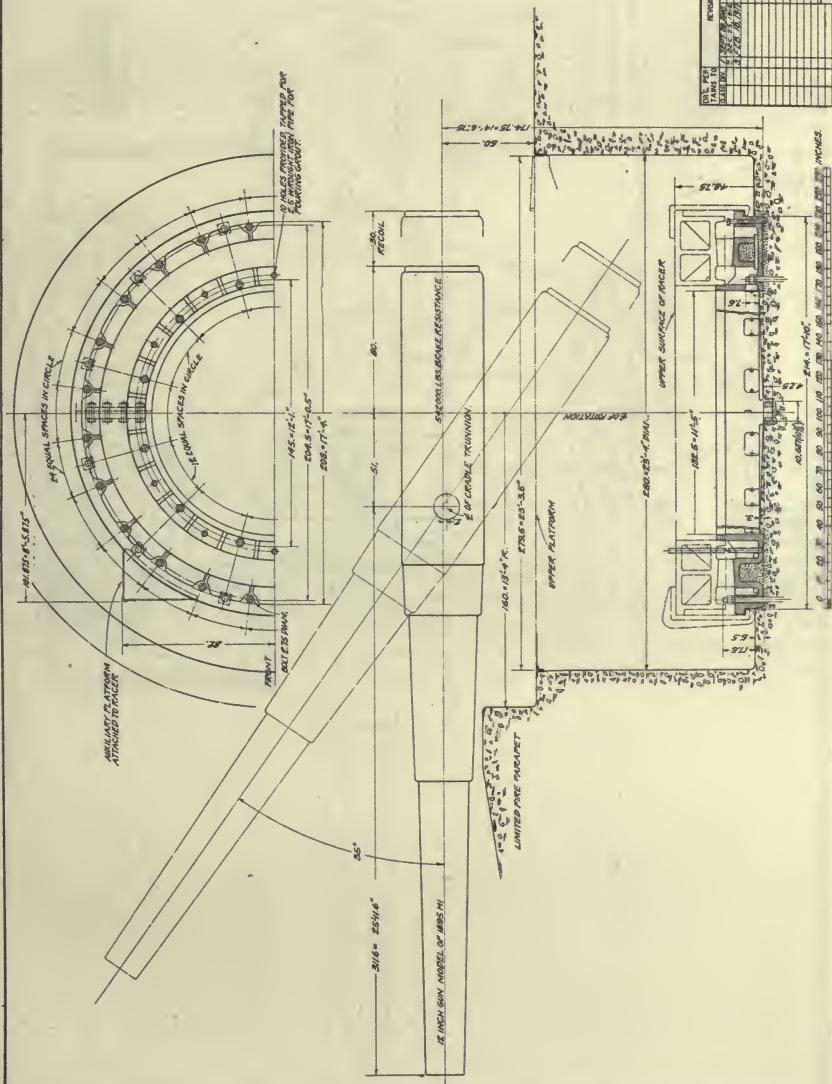
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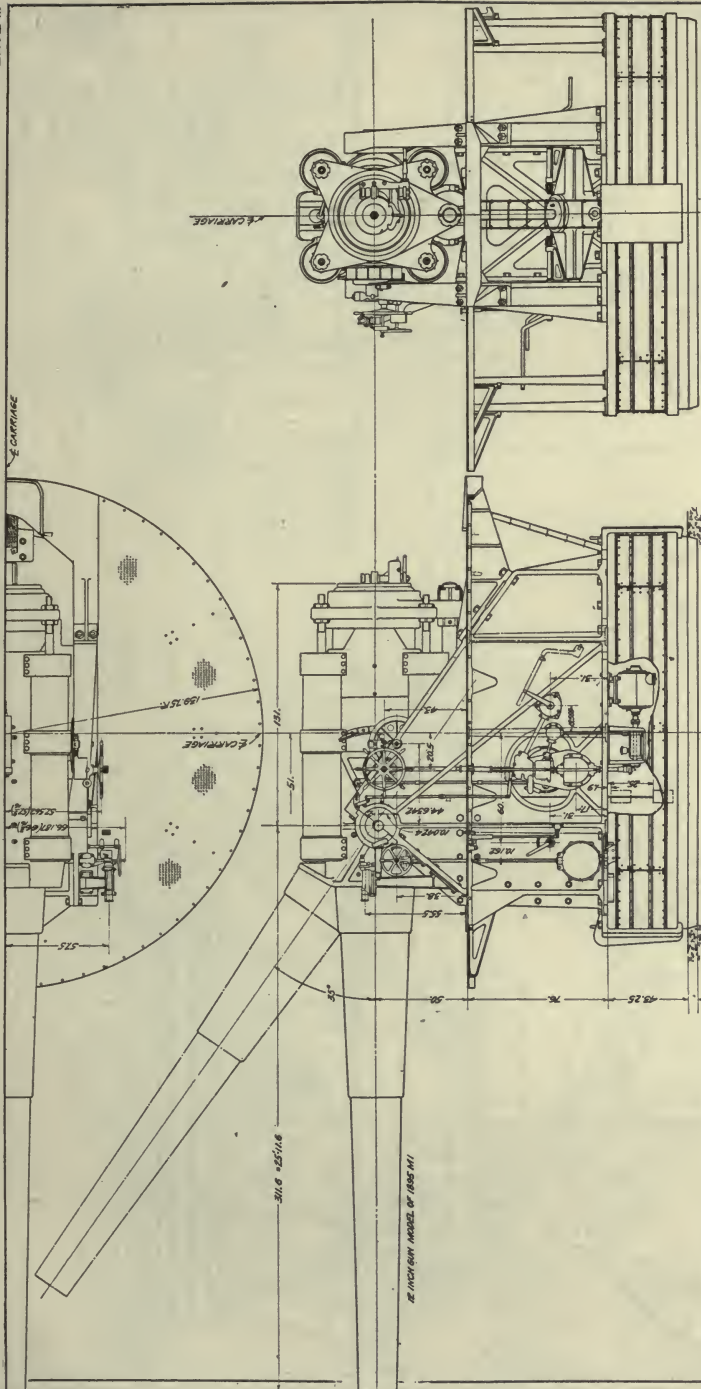
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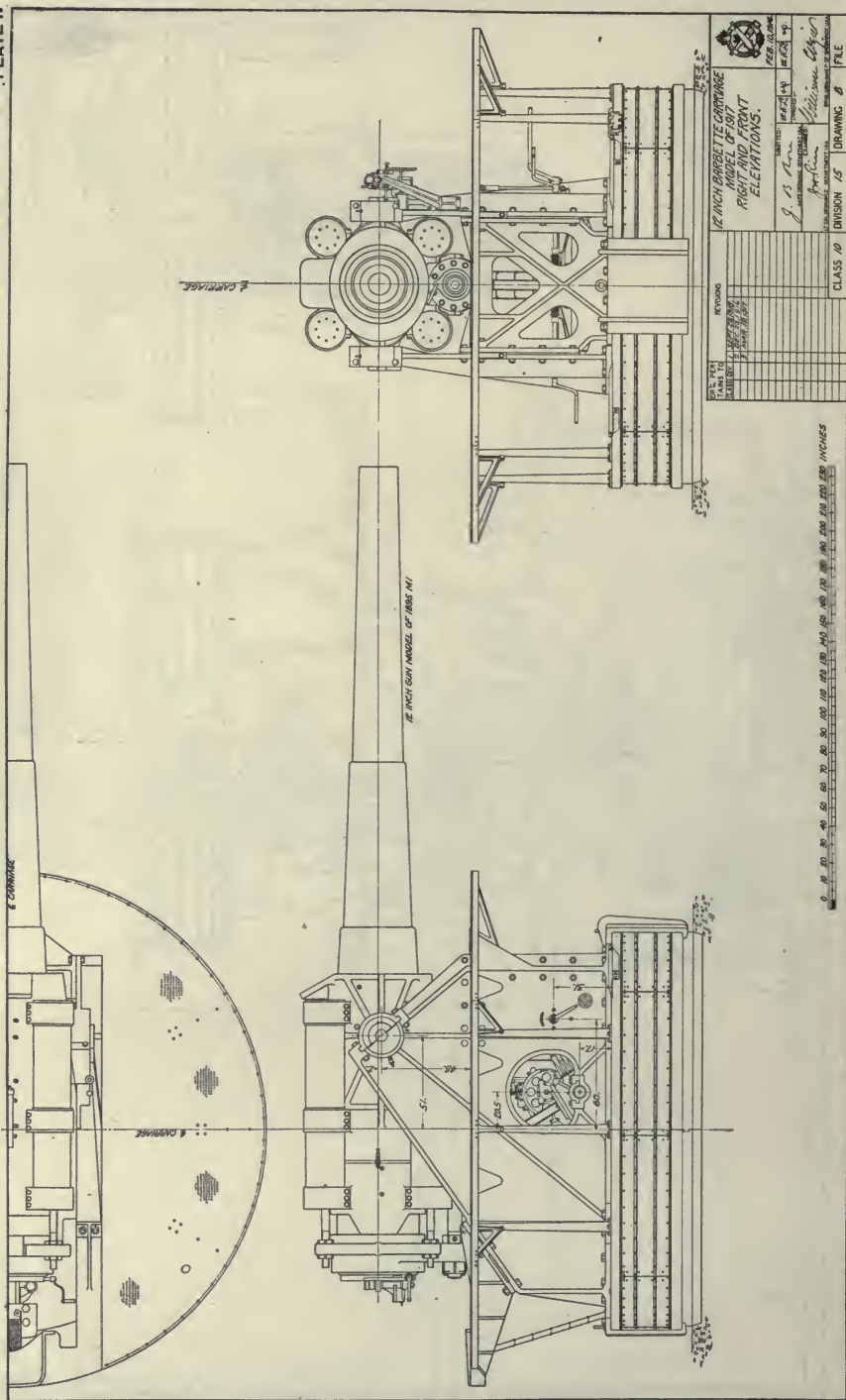
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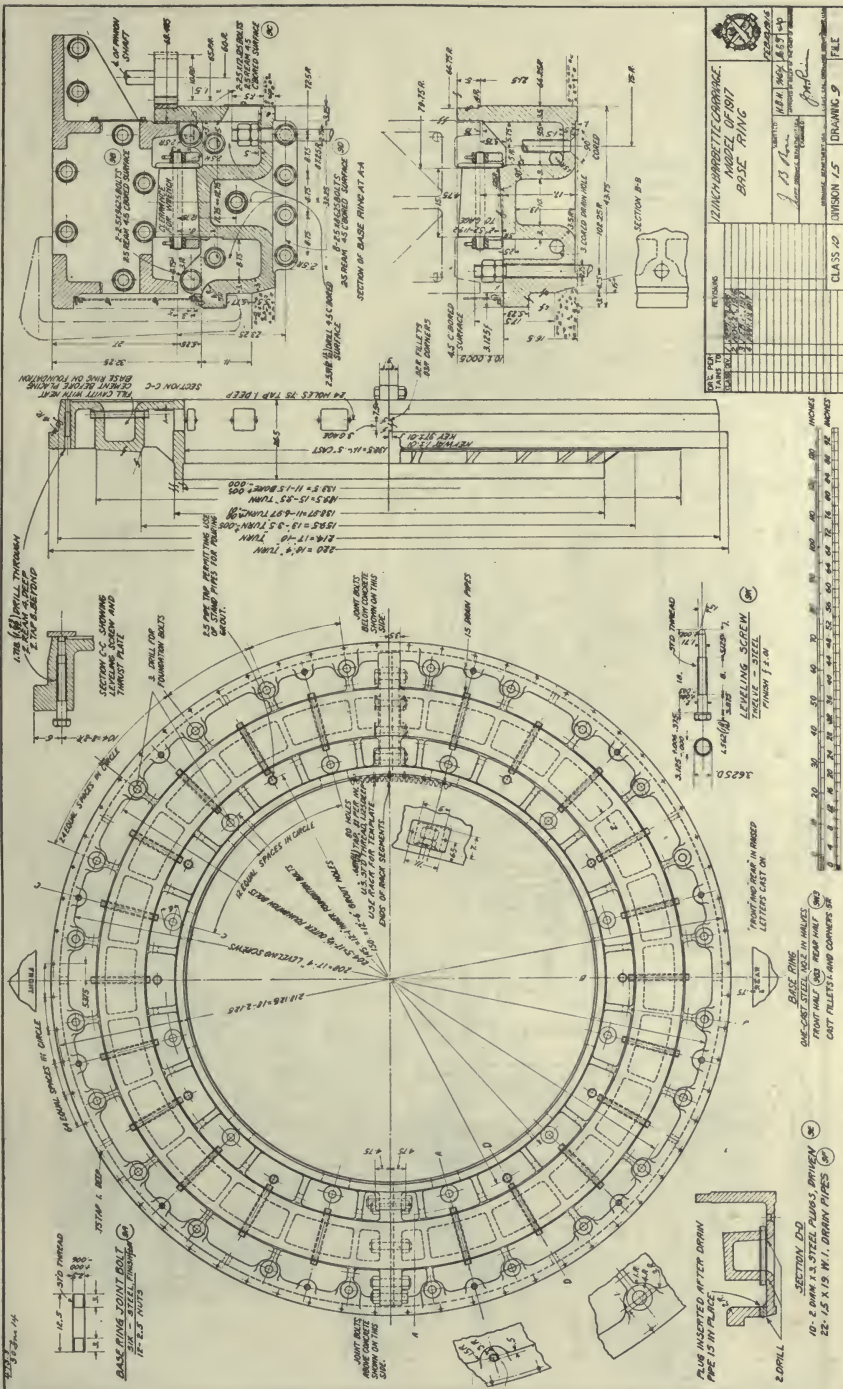
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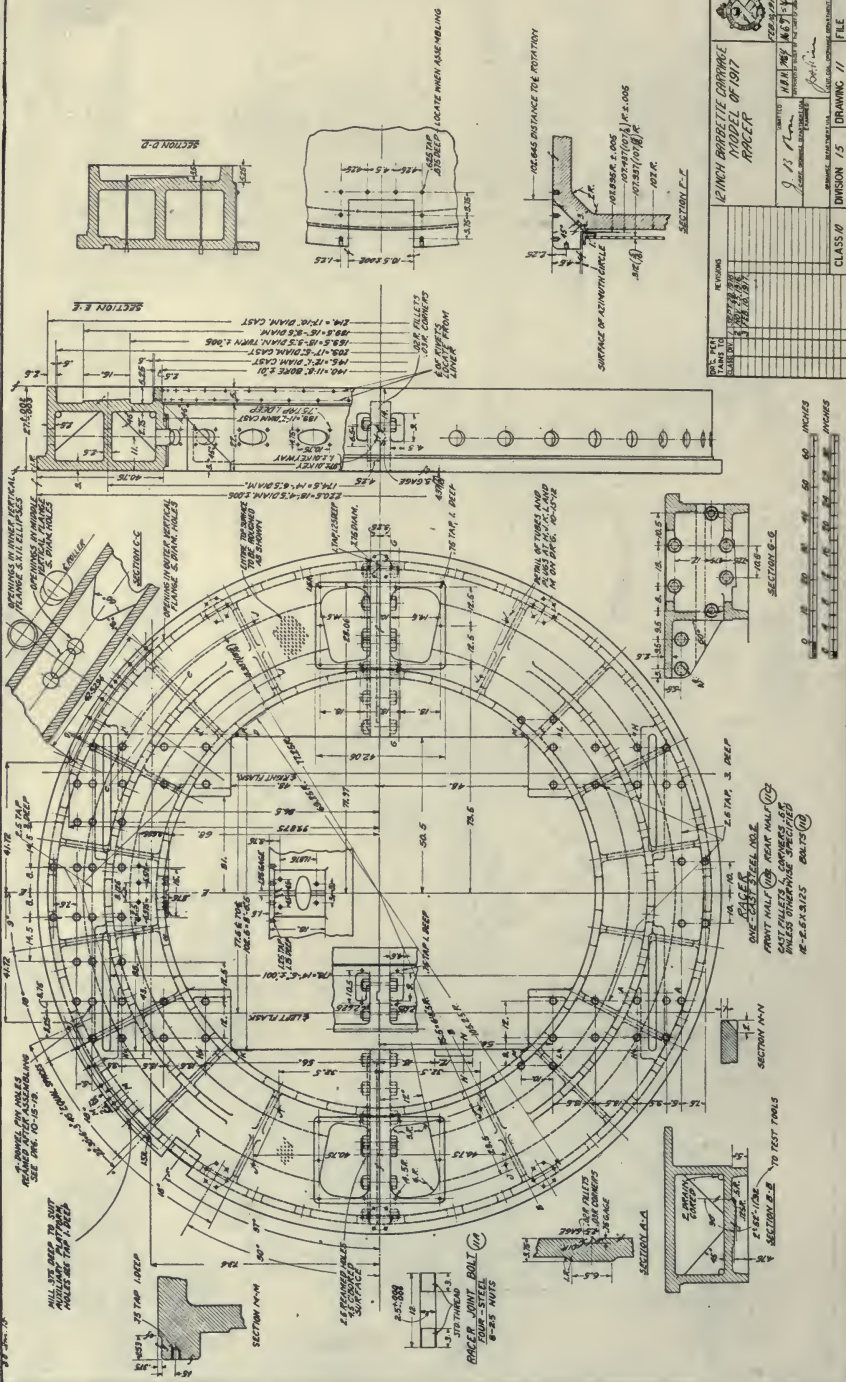


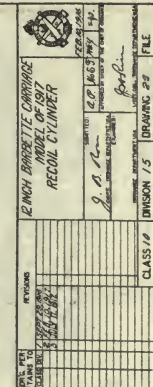
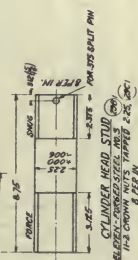
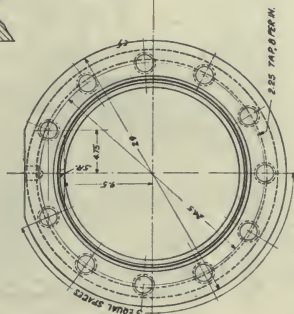
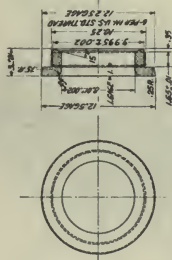
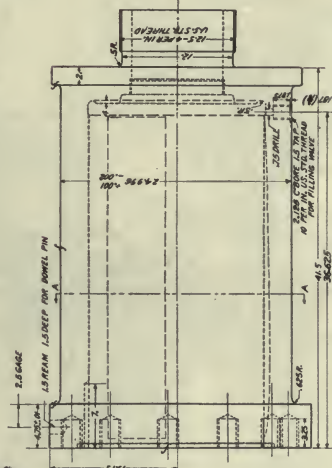
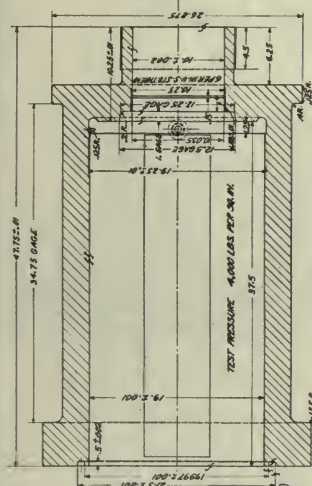
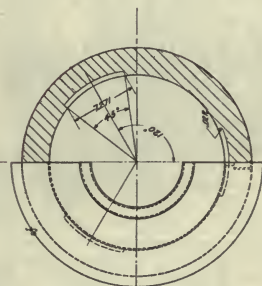
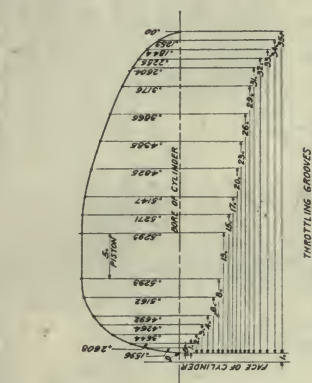
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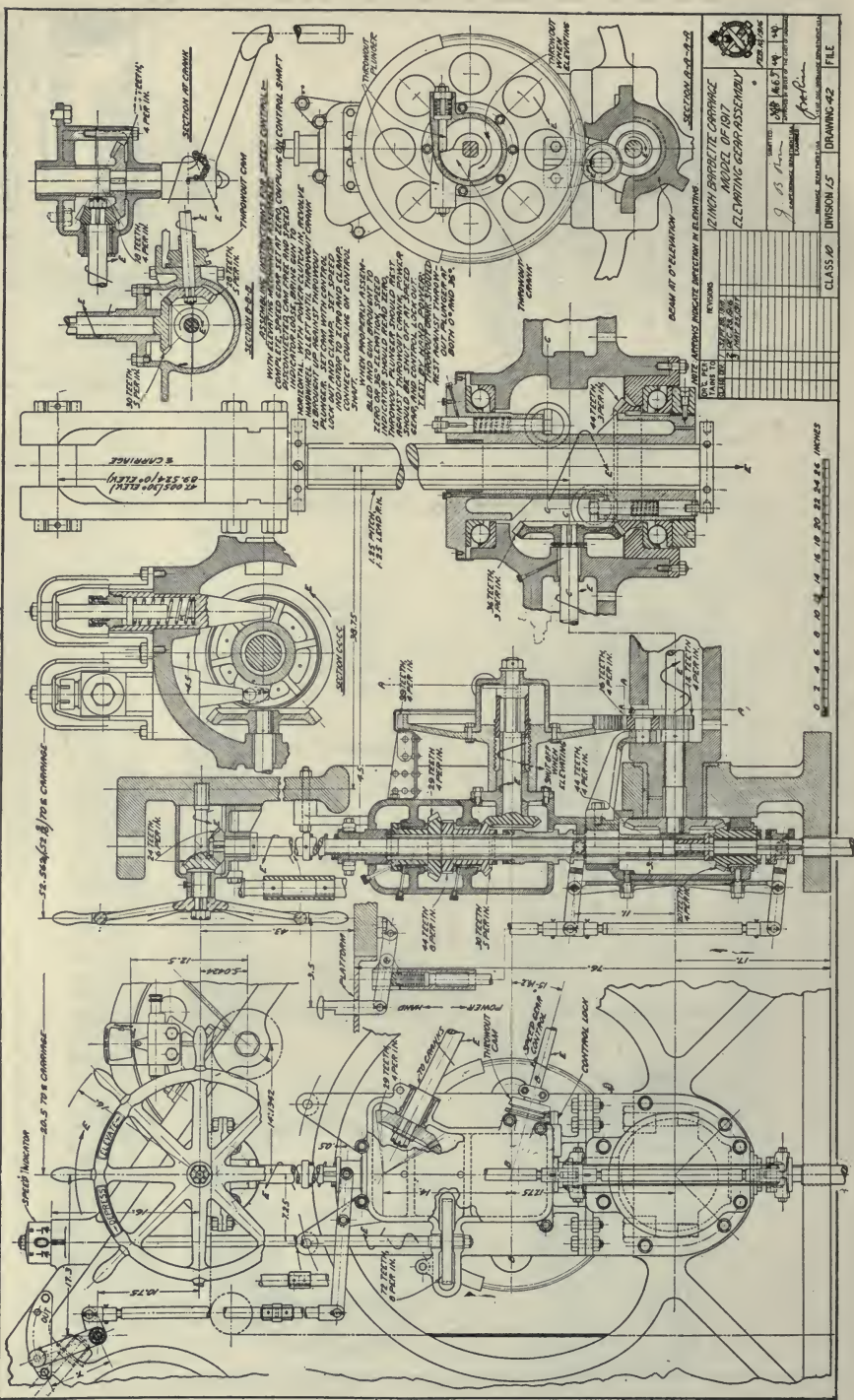
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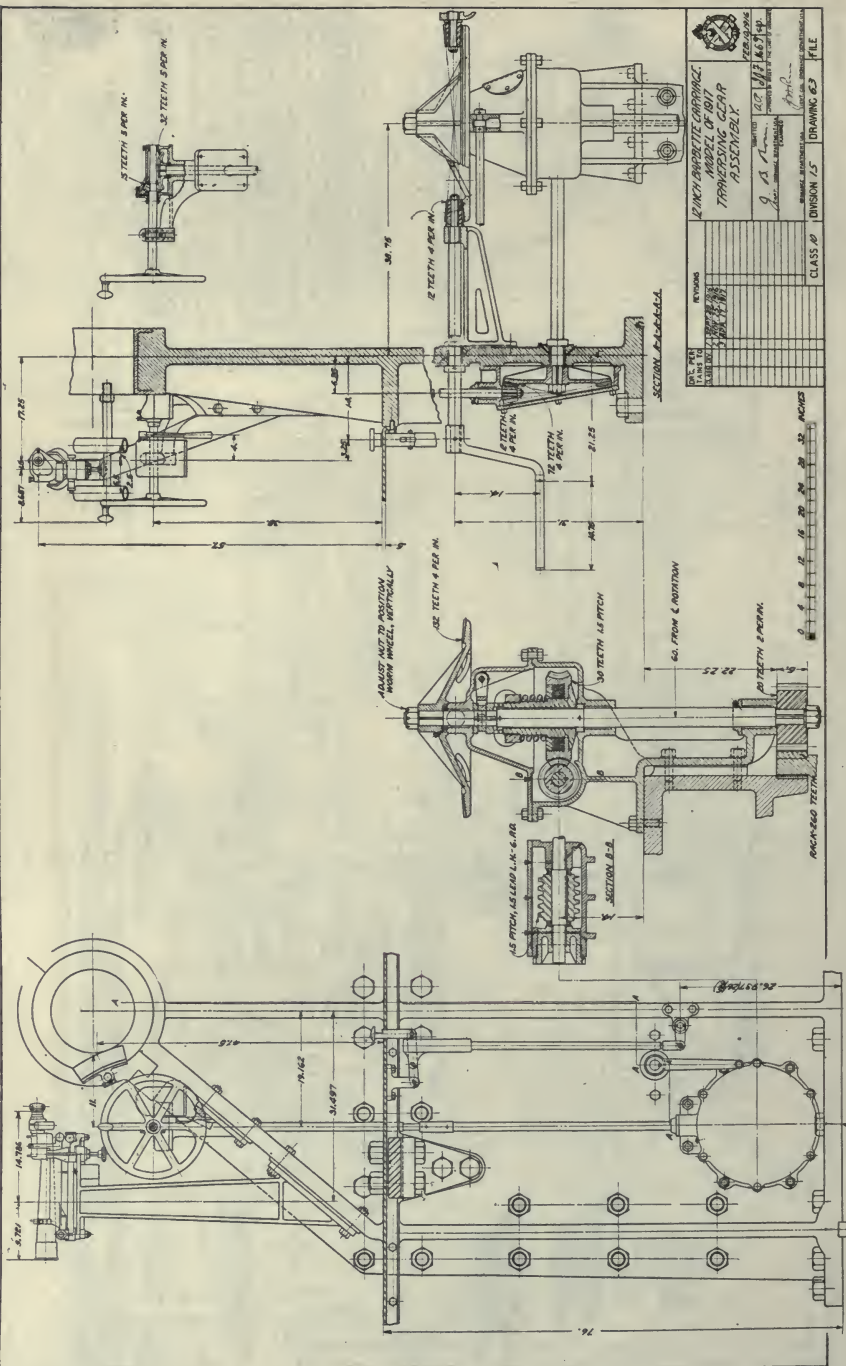












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